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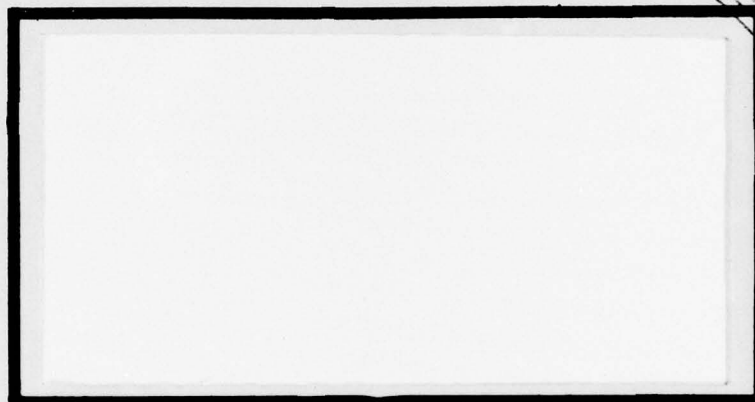


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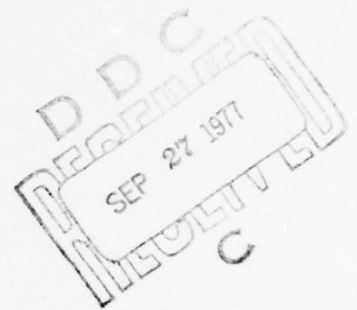


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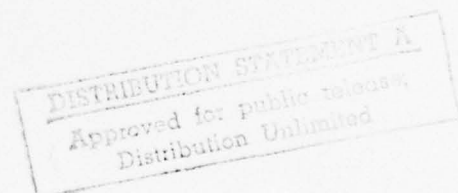
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A STUDY OF THE RELATIONSHIP BETWEEN
WORKER ATTITUDES AND ORGANIZATIONAL
EFFECTIVENESS IN AN AIR LOGISTICS
CENTER MAINTENANCE DIRECTORATE

John E. Engel, Major, USAF

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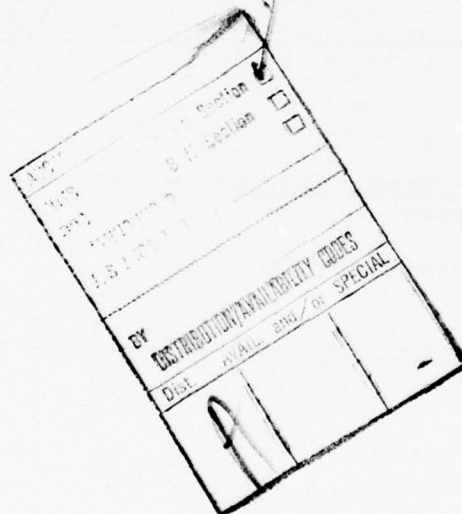
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This research effort was accomplished to determine if relationships could be found between organizational effectiveness and worker attitudes. A questionnaire containing attitudinal and effectiveness questions was administered at the Warner Robins Air Logistics Center. Five sets of independent, significant relationships were obtained. The primary findings were that the quality of supervision and group cohesiveness were directly related to efficiency, awareness, and anticipation of problems but had practically no relationship with either the quantity or the quality of the output that was produced; and that both quantity and quality were inversely related to the worker's satisfaction with his job level and his job fit. Nine specific sets of managerial postulates were identified. These postulates indicated the attitudes which were most strongly related with each of the specific effectiveness areas. The research showed that relationships do exist between specific dimensions of worker attitudes and specific criteria of organizational effectiveness, and that it is possible to identify them through multivariate analysis. It was also shown that the effectiveness of organizations could be adequately measured from the perceptions of individuals within the group about how well their unit performs. A significant bibliography is included.



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A STUDY OF THE RELATIONSHIP BETWEEN WORKER ATTITUDES
AND ORGANIZATIONAL EFFECTIVENESS IN AN AIR
LOGISTICS CENTER MAINTENANCE DIRECTORATE

A School of Systems and Logistics AU-AFIT-LS Technical Report
Air University
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Wright-Patterson AFB, Ohio

By

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Major, USAF

August 1977

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FOREWORD

This study is an in-depth report of research performed to search for specific relationships between the attitudes of workers and the effectiveness of their organizations. Since the procedures used required a highly subjective and lengthy analysis, it was necessary to include a large amount of detail in Part II and Part III. For most readers, these two sections can be omitted without loss of continuity. If, however, one desires to perform similar research in this area, then the contents of the two middle sections will provide guidance as to how one might proceed.

The specific relationships found provide an indication of which worker attitudes are most strongly related to particular effectiveness objectives. This information can be used by managers at various organizational levels to suggest areas of concentration for programs intended to improve organizational effectiveness. They certainly are no panacea but they at least provide a starting point.

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PART I

DESCRIPTION OF THE STUDY

Identification of the Problem

A major challenge in today's Air Force encompasses the problem of increasing overall performance while enduring reductions in resources. Underlying much of the effort expended in this area is the concept of organizational effectiveness. Over twenty years ago, this concept was called one of the most complex and least tackled problems in the study of organizations (10:534). Today, how to make organizations more effective is still a current crucial issue. While various techniques for improving effectiveness have recently been developed, there still has been relatively little rigorous research in this area (27:1). Probable reasons for this can be attributed to a lack of a universally accepted concept and definition of organizational effectiveness itself; to the modern day emphasis on total systems approaches which often provide too large a perspective; and to past inadequacies in the application and understanding of multivariate techniques.

The basic problem appears to have three parts:

1. To define organizational effectiveness
2. To develop criteria to measure it

3. To determine what factors are contained in or have a primary influence on effectiveness.

Although all three areas will be discussed, it is the last component, that of finding what factors are contained in and are related to measures of organizational effectiveness, that is of primary interest in this research.

Additionally, the study of organizational effectiveness contains at least three levels with which one must be concerned:

1. the level of the environment
2. the level of the social organization as a system
3. the level of the subsystems (human participants)

within the organization (15:47).

Further, if one looks to the literature for factors which influence effectiveness at each level, the list becomes staggering in both length and diversity. Categories of variables such as organizational, individual, controllable, environmental, and attitudinal contain hundreds of specific factors that have some impact on effectiveness in some given circumstance. The solution to this problem will come not by ignoring the complexity involved, but by attacking it with a systematic approach (23:21).

In this respect, the approach to be taken will be to delimit the problem by considering only those factors bearing on organizational effectiveness that can be

identified from the perceptions and attitudes of the individual workers within an Air Logistics Center. The main problem to which this study is directed, then, is to identify worker attitude dimensions and to relate them to specific measures of organizational effectiveness.

Background of the Problem

Effectiveness

Concepts of organizational effectiveness provide a basic rationale for normative theories of organization behavior and management practice. There is relatively little consensus, however, about the relevant dimensions or components of these concepts (18:357). One component that appears in practically all definitions of effectiveness and which is also most frequently used as the basis for its measurement and evaluation is that of productivity. For this reason, a brief discussion of productivity will be used to lead into the more comprehensive concept of effectiveness.

Increased productivity is a major goal of business and has long been accepted as a foundation for our constantly improving standard of living. Today, however, there is a growing reason for concern. Our annual rate of increase in productivity has become one of the lowest among the industrialized nations (4:6). Now, with problems in the areas of inflation, energy, raw material, and labor, both

commercial business and government face continuing pressure to increase, or at least maintain, output with dwindling productive resources.

Productivity is generally considered to be a function of both technology and employee job performance. While technology improvements are relatively easy to isolate and identify, improvement in productivity caused by factors relating to employee job performance is more difficult to measure due to a complex interaction of social, environmental, organizational, and personal forces. This study will not look at the area of technology but, rather, will concentrate on the analysis of the human aspects leading to performance.

A major problem, however, lies in the measurement of productivity itself. Productivity is a systemic output of all sorts of influences. This output results from the combination of all factors of production: labor, management, money, machines, and raw materials. Precise measurement of all of these factors and of their effects would be an extremely difficult if not impossible task. The problem of measurement is further compounded when one considers that output is often in terms of services or multiple products which makes isolation of the factors even more difficult.

Mott has identified two further problems. One, although productivity measures may reflect past performance, they tell us little about viability now or in the future; and two, raw productivity measures often exclude consideration of quality and production efficiency (21:21).

Still another problem is that performance is not a homogeneous variable, and difficulty will arise when one tries to measure productivity across different kinds of tasks, organizations, and occupations (24:139). This indicates that individual criteria must be established for each specific measurement. Determination of how to measure both input and output are unique to each situation. Although much progress has been made in techniques for overcoming such problems, there is still no generally accepted measure of productivity.

A most serious deficiency with productivity figures is that, while they may be adequate and useful in determining input-output ratios or in evaluating one group against another, they are only a partial (although an important) representation of total organizational performance. Productivity does not indicate how well the organization can adapt to and grow with the ever-changing environment or how well it can respond to unanticipated demands.

For the above reasons, a more comprehensive approach to the evaluation of organizations is needed. One such approach is the concept of organizational effectiveness. Georgopoulos and Tannenbaum state that a definition of organizational effectiveness must consider two aspects: the objectives of the organization and the means through which it sustains itself and attains its objectives (10:535). They identify the following as the basic objectives of organizations:

- a. high output in the sense of achieving the end results for which the organization is designed, whether quantitatively or qualitatively;

- b. ability to absorb and assimilate relevant and endogenous and exogenous changes, or the ability of the organization to keep up with the times without jeopardizing its integrity; and

- c. the preservation of organizational resources, of human and material facilities (10:535).

They then go on to define organizational effectiveness as "the extent to which an organization as a social system, given certain resources and means, fulfills its objectives without incapacitating its means and resources and without placing undue strain upon its members (10:535)."

Mott, borrowing heavily from the work of Georgopoulos and Tannenbaum, concludes that the concept

of effectiveness is multidimensional and in addition to productivity includes the ability to adapt to changing conditions and to cope with temporally unpredictable situations (21:ix). He defines organizational effectiveness as "the ability of an organization to mobilize its centers of power to produce, adapt to change, and cope with emergencies [21:34]."

In order to provide some method of measuring effectiveness, Mott establishes three general indexes: productivity, adaptability, and flexibility. He further develops his criteria of effectiveness as summarized below:

A. Organizing centers of power for routine production (productivity)

1. The quantity of the product in terms of how much is being produced

2. The quality of the product in terms of the degree of excellence or superiority

3. The efficiency with which it is produced in terms of achievement of the greatest output for the least input

B. Organizing centers of power to change routines (adaptability)

1. Anticipating problems in advance and developing satisfactory and timely solutions to them

2. Staying abreast of new technologies and methods applicable to the activities of the organization
 3. Promptness of acceptance of solutions in terms of how quickly people in the organization adjust
 4. Prevalence of acceptance of solutions in terms of the proportion of the people who readily adjust
- C. Organizing centers of power to cope with temporally unpredictable overloads of work (flexibility) (21:20).

There are, of course, other criteria for measuring organizational effectiveness. Mott's criteria will be used in this research, however, since specific measures have been developed for them which are also readily adaptable to quantitative techniques that will be used. These techniques will be discussed in later sections.

Attitudes

An organization is a unique organism whose main component is the individual, and it is this individual which should be the fundamental unit of study (12:xii). People do not just happen to do things--their actions are the result of a complex interaction between their culture, education, personal goals and desires, past experiences, beliefs, and environmental factors. Man's attitudes are made up of his feelings about the nature of things, which

are dependent on the above factors, and result in a particular behavior pattern. This pattern will have a substantial impact on the level of performance that is achieved.

Marrow, Bowers, and Seashore discuss four general approaches that may be taken to improve the performance of individuals. They are:

1. altering the individual's work environment
2. altering the perceptions and cognitions of people
3. altering the motivation of individuals
4. implanting new skills and habits (19:233-34).

They believe in the concept of a "sociotechnical system" in which technological changes must be carried out "not only with reference to the logic of work technology, but equally with reference to the potentials of the social situation [25:236]." The most important factors in improving performance are those pertaining to the relationships among people and their relationships to their work situation (19:184).

An important aspect of most work in this area is that organizational effectiveness is considered to be a function containing the attitudes of individuals. This position is further substantiated in a paper by the director of organizational research and development for General

Motors and the Institute for Social Research over the past five years have shown there is a clear relationship between plant performance and how employees feel about the organizational climate, quality of management, and employee management relationships (17:23). These and other studies in the area of organization development generally reflect the belief that better employee attitudes will enhance organizational effectiveness.

A major problem lies in the area of identifying what specific attitudes are important, and then of measuring them and of relating them in some way to effectiveness. Hinrichs, in his study of job satisfaction dimensions, states that while satisfaction can be used as a broad index, "there is an evident need for research focusing on the components of job attitudes rather than attempting to utilize a global concept of general job satisfaction in trying to understand the dynamics of organizational behavior [13:502]." This study will focus on some of these components.

A preliminary step to the analysis of attitudes is to establish some definition of just what an attitude is. Chein calls it, "a disposition to evaluate certain objects, actions and situations in certain ways [7:52]." Allport describes an attitude as "a mental and neural state of readiness, organized through experience, exerting a directive

or dynamic influence upon the individual's response to all objects and situations with which it is related (1:8)."

Also, Doob states that an attitude is:

- (1) an implicit response
- (2) which is both (a) anticipatory and (b) mediating in reference to patterns of overt responses,
- (3) which is evoked (a) by a variety of stimulus patterns (b) as a result of previous learning or of gradients of generalization and discrimination,
- (4) which is itself cue- and drive-producing,
- (5) and which is considered socially significant in the individual's society [8:43].

He adds that:

Almost all writers, no matter what their bias, agree that attitudes are learned. If this is so, then the learning, retention, and decline of an attitude are no different from the learning of a skill, a piece of prose, or a set of nonsense syllables; and they must also involve the problems of perception and motivation [8:42].

White, in an attempt to encompass a more dynamic conception of human behavior provides the following definition:

An attitude is the externalized "choice" reflecting an individual's predisposition to actively select and organize his experience in relatively continuous and predictable ways. These predispositions are products of biological, personal, and cultural forces working through an identity system capable of determining affirmative behavior [29:4].

Attitudes, then, are usually regarded as either a mental readiness or an implicit predisposition which exerts some general and consistent influence on a rather large class of evaluative responses. They most often are directed toward some object, person, or group. In

addition, attitudes are regarded as enduring predispositions and as ones which are learned rather than innate. They encompass the combination of one's perceptions, expectations, values, goals, motivations, and experiences. The techniques for measuring attitudes and for determining their relationships to organizational effectiveness are discussed in the sections on research design.

Purpose of the Research

The principal purpose of this study is to determine whether relationships exist between specific dimensions of worker attitudes and specific criteria of organizational effectiveness. As such, the study must be considered exploratory in nature since current theories of organizational behavior tend to express such relationships in rather general or global terms. Relationships that have thus far been identified through previous research have usually concentrated on either attitude dimensions or effectiveness criteria while using some general measure for the other. In this study specific measures of both attitudes and effectiveness are analyzed to search for more definitive relationships between the two.

If this exploratory research effort indicates that discernible relationships do exist, it will provide both impetus and direction for follow-on research in this area.

Primarily, the application of these relationships will enhance the development of more definitive theories pertaining to organizational behavior and management practice and may possibly indicate ways to improve effectiveness by concentrating on changing attitudes within the organization.

Major Questions Addressed by the Study

Two major questions are addressed by this study.

They are:

1. In general, do the collective perceptions of production workers about the effectiveness of their unit indicate how well their organization, as an entity, actually performs?

2. Is the relationship between production worker attitude dimensions and organizational effectiveness one of a rather general or global nature, or are specific attitude dimensions more related to specific effectiveness criteria?

Research Design

Measurement and analysis of organizational effectiveness and employee attitudes are complex problems in which a variety of methods might be used. An ideal research design is one in which the results are both valid and reliable as well as easy and inexpensive to

obtain (21:20). Unfortunately, validity and reliability are often negatively correlated with ease of calculation and expense. Tradeoffs must frequently be made in order to accomplish a study within time and cost limitations while still providing for acceptable procedures and results. The research design, which is outlined below, was developed with the intent of providing the most reasonable combination.

Data Source

Data for the study was obtained from civilian personnel at the Warner Robins Air Logistics Center (WR/ALC). Warner Robins is the worldwide logistics manager for approximately fifty types of bombers, fighters, utility aircraft, helicopters, and missiles, as well as a repair center for these aircraft and their distinct technologies. As such, Warner Robins is responsible, on a worldwide basis, for planning, programming and providing a full range of support for the assigned commodities. This includes selection of equipment, repair and overhaul, requirements determinations, budgeting, service engineering, procurement, storage and issue, transportation, and disposal. Over 17,000 civilian and 5,000 military personnel are employed at the center. The total organization operates primarily through four interrelated directorates: material management, maintenance, distribution, and procurement and production.

The Directorate of Maintenance, largest of the Warner Robins directorates, with approximately 7,000 employees, was chosen as the basic data source. This directorate is composed of four divisions: aircraft, gyro and precision equipment, electronics, and industrial products and life support systems. These divisions are manned by a relatively highly trained workforce of professional and technical specialists who evaluate, test, repair, assemble, and calibrate various products in the total inventory.

Each division is further divided into smaller units called resource control centers (RCC's). The RCC is the lowest organizational unit with full resource control and fiscal accountability. There are approximately fifty production RCC's within the maintenance directorate; and although they vary in size according to the tasks and volume involved, most contain from eighty to three hundred employees. Data from ten RCC's were included in the sample. Three RCC's were selected from both the gyro and the industrial products divisions, and two RCC's were selected from the aircraft and electronics divisions. The RCC's were chosen so as to provide data from both high producing and low producing units. The actual procedure used to select the RCC's is explained in Part II. A total of 385 usable responses was obtained.

Means of Gathering Data

Data intended to measure both effectiveness and attitudes were obtained through the vehicle of the questionnaire. The questionnaire was distributed to all volunteers in each selected unit. Each respondent was given a brief oral explanation of the purpose of the questionnaire and received instructions for its completion; he was asked to complete the questionnaire at home and to return it to a box located in his general work area.

The questionnaire was in two parts. Part one contained questions designed to measure the individual's perception of organizational effectiveness, and part two concentrated on attitudes. Each is discussed separately below.

Effectiveness

A series of eight questions was used to measure effectiveness. They were taken directly from a study by Mott (21:205-7) who followed the lead of Georgopoulos and Mann (9) in attempting to construct valid subjective measures of organizational effectiveness. Only slight variations in wording were made to adapt the questions to the terminology used by the data source. The actual questions used appear in appendix A. They are intended to measure the following items contained in the basic criteria of effectiveness:

1. Production: Quantity
2. Production: Quality
3. Production: Efficiency
4. Adaptation: Anticipating Problems and Solving Them Satisfactorily
5. Adaptation: Awareness of Potential Solutions
6. Adaptation: Promptness of Adjustment
7. Adaptation: Prevalence of Adjustment
8. Flexibility

Mott computed product-moment correlations among the three basic indexes of productivity, adaptability, and flexibility as well as between the indexes and their component items. He found that correlations among the indexes were all positive, statistically significant, and that no index explained more than 25 percent of the variance in the others. He concluded, therefore, that they were not mere reproductions of one another but that they measured three different, although related, organizational processes (21:25). Additionally, validity studies of the effectiveness measures were conducted by using rank-order correlations of composite effectiveness scores between the self-ratings and top-management ratings and between the self-ratings and ratings by people in other units. Both correlations were significant at the 5 percent level and suggested considerable agreement on the relative

effectiveness of the organizations (21:193). It was concluded that the effectiveness questions, as answered by the individual workers, constituted a valid and inexpensive measure of organizational effectiveness. The only exception was when responses reflected outmoded standards (21:199). Mott's questions were, therefore, used as an acceptable data collection vehicle for the purposes of this study, especially since the objective was not to measure effectiveness, per se, but to look for relationships between the effectiveness measures and the attitudes of the workers. Mott granted permission for the use of these effectiveness questions.

Attitudes

The measurement of attitudes has become more precise in recent years. Earlier definitions and measuring instruments regarded attitudes primarily as unidimensional. More current definitions reflect the multidimensionality of attitudes and of techniques for their measurement (14). Because of this, an instrument which contained a relatively large number of dimensions was desired. A questionnaire of this type was compiled by Lt Col John B. Camealy, Executive Program Director, Air Force Logistics Command. The questionnaire consists of 94 items and is contained in appendix B.

The questionnaire was developed in 1974 to assist in the evaluation of performance enhancement efforts within the Air Force Logistics Command. Three management representatives from each of the five air logistics centers met with Camealy and his staff in an attempt to construct a questionnaire that could be used to measure before and after attitudes of workers participating in an organization development program. While there was no intent to classify each question as representing a particular attitude, an attempt was made to be as comprehensive as possible by including questions relating to a variety of attitudinal variables. Because of the diversity and relatively large number of questions contained in this questionnaire, it is an ideal vehicle for determining and measuring attitude dimensions through the use of factor analysis. This technique is discussed more fully in following sections.

A second reason for using this particular questionnaire is that it is already in use in over 41 pilot projects throughout the Air Force Logistics Command (6:19). These projects are examining the effect of organization development interventions on both productivity and worker attitudes. A wealth of data will, therefore, be available for additional research emanating from this and other studies.

Development of the Research Method

A review of the literature has shown that techniques used to analyze relationships between effectiveness and attitudinal data have followed an evolutionary pattern employing increasingly more complex quantitative concepts.

Up to the late-1950's most studies in this area were accomplished through basic correlation analyses which often used rather general measures for attitudes and performance. A rather extensive review of the literature in this period was conducted by Brayfield and Crockett and indicated that there was little empirical evidence showing any appreciable relationship between attitudes and performance (5).

Studies conducted after the mid-1950's frequently included some type of factor analysis to indicate more specific dimensions contained within the attitudinal data. These studies generally found that there were discernible relationships between certain attitude dimensions and performance. A deficiency in the knowledge about these relationships still existed, however, since most of the correlations were between a specific attitude dimension or performance measure and a general measure of the other.

The research in this study expands upon previous research performed in the area in that the data are examined to search for relationships between specific measures of

effectiveness and specific attitude dimensions. The technique which accomplishes this type of simultaneous examination is called canonical analysis and is discussed more fully in following sections.

Means of Data Analysis

Two multivariate analysis techniques were used in the conduct of this research, factor analysis and canonical analysis.

Factor Analysis

Factor analysis is basically a technique for reducing a relatively large set of data into a few more interpretable constructs. It was used to reduce the set of 94 items contained in the second part of the questionnaire to a smaller number of dimensions. These dimensions, or factors as they are often called, were considered to be basic dimensions of the attitudinal data. This process has been called the "R-factor analysis," or the "R-technique (20:242)." Examination of the simple correlations among the raw scores of these 94 questions does not bring into view the net simultaneous relationships between the variables. Factor analysis does accomplish this, which is why it is recognized as a powerful multivariate technique (20:241).

This technique provided for a reduction of the data to twenty-four identifiable dimensions. Additionally, a factor score was computed for each respondent on each attitude factor. This score represents the degree to which each respondent positively marked the group of items that loaded highly on each factor. Since these factor scores can be treated as if they were "raw scores," they were used in and in fact simplified the follow-on canonical analysis (28:225).

The result of the factor analysis, then, extracted a smaller set of dimensions from the set of 94 questions and provided a quantitative score for each. The factors were then subjectively analyzed to determine what dimensions of the attitudinal data were actually measured. This analysis appears in Part III.

Canonical Analysis

At this point in the analysis, two sets of data existed--a set of eight variables measuring organizational effectiveness and a set of twenty-four variables depicting worker attitude dimensions. The task was now to find the overall relationship between these sets of data. Canonical analysis was the method used to describe this relationship.

The objective was simultaneously to predict a set of dependent variables from their joint covariance with a set of independent variables. The procedure obtained a

set of weights for the variables which provided the maximum simple correlation between the composite dependent variable and the composite independent variable (25:13-19). One set of variables was defined as the effectiveness measures and the other as the attitudinal dimensions. The resulting coefficients enabled one to ascertain the relationships between the two by allowing one to determine which variables in each set contributed the most to the relationship.

The computations involved in both the factor and canonical analysis were, of course, substantial. There are, however, pre-written computer programs which were used to perform these calculations. A more detailed explanation of these techniques appears in Part II.

Limitations

There are two major limitations to this research effort. The first is that the results cannot be considered normative, and the second is that specific implications for management action should be considered only as guidelines and not as a panacea.

Since the respondents to the questionnaire were all civil-service workers and were all from Warner Robins, the relationships that were found between the dimensions of the attitudinal data and the measures of effectiveness

may not be the same as those found in units in other parts of the country or in other types of organizations. For this reason, additional studies will be needed before any generally applicable conclusions can be made.

Also, the research design was intended to identify specific relationships between the variables but not to show that strong cause and effect associations were present. This limits the implications for management that should be derived from the study. Part of the conclusions of this effort, therefore, must be stated in terms of "theoretical" implications or as postulates for management consideration. Further research is required before these implications can be either accepted or rejected or a cause and effect relationship strongly asserted. The management postulates derived from the analyses are stated in Part IV.

PART II

STUDY CONTENT AND DESIGN

Introduction

The purpose of any research effort is to support or discover answers to questions through the application of some type of structured procedures. This process will always begin with a question or a problem of some sort and then proceed in an orderly and systematic manner to arrive at a conclusion. The observation of an event or a series of events may lead one to question whether actions of this sort always follow the same general pattern or whether there are circumstances under which the outcome may be different. Or, one may seek an explanation of the process by which certain conditions lead to specific outcomes. In order to be answerable through research, these questions must have one common characteristic: they must be such that observation or experimentation of some type can provide the information necessary to make a valid inference or decision. The problem then becomes one of determining what data to gather, how to gather it, and how to analyze and present the information obtained from that data in order to arrive at a conclusion. The purpose of this

section is to explain both the rationale and the procedure that was employed in the conduct of this research.

The Questionnaire

Data on both effectiveness and worker attitudes were obtained by means of a questionnaire. In the case of measuring attitudes, the questionnaire is a relatively simple and commonly used vehicle. The use of a questionnaire to measure effectiveness has also become a generally accepted practice. Many individuals studying effectiveness, however, still prefer to use the so-called "hard-criteria," or objective measures of productivity, absenteeism, standard costs, and the like. The problem with these is that different measures must often be developed for different types of organizations (a somewhat subjective process in itself); and even then, they are not comprehensive in that such objective measures still usually represent only the production aspects of the organization. A more comprehensive and universally applicable measure of effectiveness was needed. Such a device was found in a study conducted by Mott (21). He developed a series of eight questions which provided a subjective measure of effectiveness in terms of productivity, adaptability, and flexibility. Since the responses to these questions appeared to provide both a valid and inexpensive method of measuring effectiveness, it

was decided that a two-part questionnaire could be used to obtain both attitude and effectiveness data. Part 1 discusses both the effectiveness and attitude sections. The actual questions appear in Appendices A and B.

The effectiveness questions were developed by Mott to study the relationship between organizational effectiveness and various organizational characteristics such as coordination, leadership styles, methods of communication, problem solving, and structures of decision-making. In this study, they were used to study the relationship between effectiveness and dimensions of workers' attitudes. The tests that were made against these questions are still valid, however; only their application has changed. Correlations showed that the questions measured different, although related, organizational processes (21:25). Several different validity studies were conducted which indicated that the questions were sufficiently valid and reliable measures of effectiveness (21:189-204). These questions should, therefore, provide an adequate vehicle for gathering the effectiveness data.

The attitude questions used in this study have not been subjected to classic validity testing. There are, however, several reasons why they were still chosen as an acceptable data gathering instrument.

The following procedure was used by Lt Col Camealy in the development of these questions. Fifteen lead individuals in the behavioral sciences area (three from each Air Logistics Center) met with Lt Col Camealy and his staff. They were separated into three work groups, with one representative from each ALC in each group. The groups then went into individual sessions to develop a set of questions which would provide the group with information they felt would assist them in developing management programs and assistance. A total of 280 questions was developed. Lt Col Camealy, through a purely subjective process, then eliminated duplicate questions and reworded some of the others to arrive at the ninety-four questions which appear in Appendix B. Lt Col Camealy stated that because of his many years of experience in measuring attitudes, because of the diversity and relatively large number of questions, and because of the fact that specific attitudes that are measured are not predetermined but are identified from a further analysis of the responses, that the classic validity tests were not essential in this case.

This position is supported, somewhat, by Bohrnstedt who states that although content validity must be carefully considered in constructing achievement and proficiency tests, it is not usually of prime consideration in

constructing attitude scales (3:91). He further states that it is a common practice for researchers in the area of attitude measurement to first devise a number of items which they believe will measure various attitude dimensions and then to analyze the items after data have been collected to determine whether the items constructed to measure an attitude dimension cluster together (3:91-93).

Further support is provided by Kerlinger and Kaya who state that one of the most powerful approaches to validating an attitudinal instrument is to concentrate strongly on the logical validity stage of measurement (16:254). They consider factor analysis, at least in good part, to be a logical validity tool and warn that checking one attitude instrument against another, in order to determine validity, can be a dangerous and circular procedure. They claim that although the Likert method (which is used in this questionnaire) is limited in that, in and of itself, it gives little clue to the factors behind the attitudes being measured, the problem is alleviated if the questions are intercorrelated and then factor analyzed (16:264). Since a factor analysis of the attitude questions is part of the design of this research, the use of these questions would appear to be appropriate.

Additionally, these attitude questions are being used with several Air Force performance enhancement projects

throughout the country. Consultants to these projects have included: Frederick Herzberg, University of Utah (projects at Ogden Air Logistics Center, Utah); Wendell French, University of Washington, and Norman George, University of Dayton (projects at Air Force Logistics Command Headquarters, Dayton, Ohio); and Ted Smith, University of Georgia (projects at Warner Robins Air Logistics Center, Georgia). The wide use of this questionnaire provided further support for its use as an acceptable attitude measuring device.

The Data Analysis

The data were analyzed through the use of two mathematical techniques. A factor analysis was first performed on the attitude questions. This reduced the data to twenty-four dimensions. A canonical analysis was then performed between the attitude dimensions and the eight measures of effectiveness in an attempt to explain as much of the effectiveness variable set as possible from the attitudinal variable set (27:516). The intent was to show, for example, that the way workers felt about their job fit was more strongly related to the quantity of output than to any other effectiveness variable. No attempt was made, however, to develop a priori relationships since they could be different from one organization to another. A discussion of the basic concepts of factor and canonical analysis techniques follows.

Factor Analysis

Probably the single, most distinctive characteristic of factor analysis is its data-reduction capability. Given an array of input variables, factor-analytic techniques enable one to see if some underlying pattern of relationships exists such that the data may be condensed or "reduced" to some smaller set of factors that may be taken as source variables accounting for the interrelations in the data (27:469). The objective was to locate the dimensions which had maximum interpretability.

Factor analysis is based on the proposition that if there is a systematic interdependence among variables, that it must be the result of some fundamental characteristics which underlie the commonality of such variables (25:16). The interpretation of these characteristics, or factors, ordinarily involves three steps: preparation of a correlation matrix, extraction of the initial factors, and rotation of the factors to a maximally interpretable solution (22:469). It should be pointed out, however, that factor analysis can only indicate underlying factors; it cannot identify what they actually are. The labeling or determination of what each factor or dimension is requires a subjective evaluation of the variables which have the highest loadings on that factor.

Since factor analysis is concerned with relations among observations, it commonly starts with the development of a correlation matrix. In an extremely simple example using only six questions, a correlation matrix might be computed as shown in Table 2-1.

TABLE 2-1
CORRELATION MATRIX

Question	Question					
	1	2	3	4	5	6
1	1.00	0.72	0.16	0.23	0.63	0.09
2	.72	1.00	.23	.35	.57	.15
3	.16	.23	1.00	.76	.21	.67
4	.23	.35	.76	1.00	.32	.81
5	.63	.57	.21	.32	1.00	.30
6	0.09	0.15	0.67	0.81	0.30	1.00

We know that if two or more variables are highly correlated they must share some common factor variance. Therefore, one needs to determine how many underlying factors there are. Now, if we look at the correlation matrix, we can see that variable 1 is highly correlated with variables 2 and 5, and that variable 3 is highly correlated with variables 4 and 6. We should expect, therefore, to have at least two factors emerge. Let us now assume that the actual correlations are not as clearly orthogonal as

in the above example and that the initial factor extraction shows correlations on two factors, as indicated in Table 2-2.

TABLE 2-2
A FACTOR LOADINGS MATRIX

Question	Factors		Communality (h^2)
	A	B	
1	0.71	0.40	0.66
2	.70	.46	.70
3	.69	-0.41	.64
4	.65	-0.43	.63
5	.70	.37	.61
6	0.71	-0.39	0.66
Eigenvalue	2.89	1.01	3.90
% of variance	0.48	0.17	0.65

It can be seen that although two factors are shown, their meaning is not at all clear. This is the usual situation. Before we discuss how to improve the interpretability, an explanation of what each of the figures means is in order.

The six figures directly under columns A and B are called the factor loadings and represent the correlations between the variables and the factors. The variation of

question 1 accounted for by factor A is $(.71)^2$ or .50. That is, 50 percent of the total variance of question 1 is accounted for by factor A. The total variance of question 1 accounted for by all the factors is called the communality, designated h^2 . It is determined by summing the squares of each of the factor loadings of the variable. In the example, the communality of question 1 is $(.71)^2 + (.40)^2 = .50 + .16 = .66$. This value indicates the percent of the variance which is accounted for by the common factors. In this case, 66 percent of the variance in question 1 can be accounted for by factors A and B.

Another important figure is the eigenvalue of each factor. This is determined by summing the squares of each of the loadings on a factor and indicates the amount of total variance in the data that that factor accounts for. When this figure is divided by the number of variables it shows the percent of total variance accounted for by that factor. Factor A, therefore, accounts for 48 percent of the variance in the data, while factor B accounts for 17 percent. Both factors combined account for 65 percent which means that 35 percent of the variance is to be found in other factors. The concept of the eigenvalue is important in that the factors which are normally considered meaningful are those whose eigenvalues are greater than one. The logic behind this is that at the point where the

variance explained by additional factors is less than one, the total variance explained by the factor is less than the variance explained by an original variable. The number of factors to be considered for further analysis, therefore, is commonly determined by the eigenvalues.

The factor analysis is not complete, however, since the "meaning" of the factors has not yet been shown. The normal process to accomplish this is called factor rotation. As an analogy, factor rotation is something like staining a microscope slide. Just as different stains reveal different tissue structures, different rotations reveal different structures in the data, even though in both cases the structures were always there (28:217). The purpose is to add a degree of interpretability to the factors. The two most common rotation methods in attitude measurement are the orthogonal varimax rotation, which centers on simplifying the columns of a factor matrix, and the oblique rotation, which relaxes the orthogonal requirement to provide factors that are empirically more realistic. Since the oblique rotations are normally more difficult to interpret, the orthogonal rotation was used in this study. An example of such a rotation is shown in Table 2-3.

Note that now the meaning of factor A can be analyzed by examining questions 3, 4, and 6; while factor B can be analyzed using questions 1, 2, and 5. The

determination of the "meaning" of the factor is still, however, a subjective evaluation. Note also, that while the eigenvalue of each factor changed due to the new structure, the communality and the total percent of the variance explained by the factors did not.

The identification of attitudinal dimensions was attempted by following the procedure outlined above. The result of the factor analysis shows how many meaningful factors are contained in the data and indicates which questions should be analyzed in interpreting each dimension.

TABLE 2-3
ORTHOGONALLY ROTATED FACTORS

Question	Factors		Communality
	A	B	
1	0.23	0.78	0.66
2	.18	.82	.70
3	.78	.18	.64
4	.77	.14	.63
5	.25	.75	.61
6	0.78	0.21	0.66
Eigenvalue	1.98	1.92	3.90
% of variance	0.33	0.32	0.65

Canonical Analysis

Canonical analysis is a multivariate technique which is used to test the relationships between two sets of variables. In general, the objectives are:

1. To determine vectors of weights for each set of variables such that linear combinations of the respective variables are maximally correlated.

2. To determine whether two sets of variables are statistically independent of one another, or conversely, to determine the magnitude of the relationships between the two sets.

3. To explain the nature of any relationships between the sets of variables (2:187).

Once the attitude dimensions have been identified by a factor analysis, the factor scores for the dimensions will be used as one set of variables. The other variable set will be the responses to the eight organizational effectiveness questions. These two sets of data will then be analyzed for the existence of relationships between them.

Typically, the nature of these relationships can be inferred by noting both the sign and the magnitude of the canonical weight assigned to each variable. However, unless the variables within each set have been previously reduced to linearly independent variates, the existence of multicollinearity may obscure the relationships (2:189).

The factor analysis performed on the attitude data provided independent attitude dimensions. One reason the varimax rotation was used was that the factor axes are orthogonal, and the dimensions are relatively uncorrelated. The oblique rotation, in addition to being difficult to interpret, does not require these restrictions and, therefore, the factors may be correlated (22:483). This concept of first performing a factor analysis and then a canonical analysis in order to provide for a more efficient analysis of the data has become an accepted procedure (11:164; 187 and 192).

Interpretation of the results of a canonical analysis can perhaps be best explained by an example. Table 2-4 shows the results of an analysis performed on variables pertaining to product use and personality traits (26:69). As can be seen, there are three pairs of canonical variates. The first pair is selected so as to have the highest intercorrelation possible. A second pair of variates is then selected to account for a maximum amount of the relationship between the two sets which is left unaccounted for by the first pair, and so forth. This technique produces combinations of variables that are independent or uncorrelated with one another. These variates, like factor loadings, are composed of coefficients that reflect the importance of the original variables in

TABLE 2-4
RESULTS OF A CONONICAL ANALYSIS

Variables	Canonical Variates		
	1	2	3
<u>Product use variables</u>			
Headache remedy	-0.01	-0.44	0.11
Mouthwash	-0.16	-0.45	.28
Men's cologne	.23	-0.19	-0.21
Hair spray	.07	.07	.08
Shampoo	-0.38	.16	-0.01
Antacid remedy	-0.14	-0.17	-0.32
Playboy	.15	.16	.52
Alcoholic beverages	.46	.31	-0.13
Brush teeth	-0.19	-0.02	.23
Fashion adoption	.32	-0.40	.08
Complexion aids	-0.02	.09	.18
Vitamin capsules	.29	-0.06	-0.50
Haircut	-0.17	.18	-0.02
Cigarettes	.40	.06	-0.29
Coffee	-0.24	-0.25	.13
Chewing gum	.20	-0.13	.13
After-shave lotion	-0.03	.30	.01
<u>Personality trait variables</u>			
Ascendancy	.02	-0.05	-0.44
Responsibility	-0.51	.08	-0.17
Emotional stability	.43	.64	.49
Sociability	.61	-0.36	.62
Cautiousness	-0.29	-0.60	.24
Original thinking	.24	.16	-0.31
Personal relations	-0.12	-0.06	.04
Vigor	.17	.26	.05
Eigenvalues	.37	.30	.17
Canonical R	.60	.54	.41
Chi-square	72.74	56.70	29.84
d.f.	24.00	22.00	20.00
Significance	0.0001	0.0002	0.0752

the subset forming the variates. One essential point is that for each variate, the two subsets are meant to correspond; that is, the first canonical variate from the first set of variables and the first canonical variate from the second set of variables are chosen so as to maximally correlate with each other. The amount of correlation between each corresponding pair is the canonical correlation between them (labeled Canonical R), and its square (labeled Eigenvalue), represents the amount of variance in one subset that is accounted for by the other (22:517). In the example the first set of variates has a correlation between the sets of .60. The square of this correlation gives an eigenvalue of .36 which means that 36 percent of variance is shared by the first pair of canonical variates. The significance of each set of variates is also given and is determined by the chi-square and degrees of freedom. The significance levels of .001, .002, and .0752 for the three sets of variates indicate that significant relationships do exist. It is the interpretation of these relationships, however, that is of more interest. The meaning of each relationship can be analyzed by examining those variables with relatively heavy loadings from each paired set.

In the first set of variates, the use of shampoo, alcoholic beverages, early fashion adoption, and

cigarettes seem to be the best indicators of an individual who is emotionally stable, sociable, and irresponsible (note the minus sign for the responsibility variable).

The second set of variables can best be interpreted by changing all of the signs for the coefficients. This shows that the use of headache remedies and mouthwash, late fashion adoption, and infrequent use of after-shave lotion indicate one who is sociable, cautious, and emotionally unstable.

Of particular interest is that both early and late fashion adoption are related to sociability, but in different contexts. A complex connection between sociability and early fashion adoption seems to exist in which sociability combined with emotional stability and irresponsibility is oriented toward one sort of action, while sociability combined with cautiousness and emotional instability is oriented toward its opposite. The third set of variates can be analyzed in similar fashion.

The example given above is from a marketing application since market analysts have been major users of the canonical analysis technique. There is no clear reason, however, as to why the procedure has not been used more frequently in management applications. Perhaps this study will provide some impetus in that direction.

Of course, just as factor analysis will produce factors which an individual may or may not be able to interpret, canonical correlation analysis can produce sets of variates, even clearly defined ones, that may not make sense. Computer programs can only manipulate the intercorrelations among the variables to see if a particular type of patterning exists in the data; it is left to the researcher to explain why that pattern is present and what theoretical sense it makes (22:518).

Sample Selection

Thus far, the geographical location for gathering the data (Warner Robins Air Logistics Center), the data collection vehicle (the questionnaire), and the quantitative methods to be used (factor and canonical analyses) have been established. One final item remaining before the actual data collection could begin was the identification of the specific resource control centers (RCC's) from which volunteer respondents would be solicited. This section discusses the rationale used to select the units.

It was felt that the best opportunity for finding discernible relationships while still allowing for a diverse sample would be to choose a relatively high performing and a relatively low performing unit from

each of the four maintenance divisions. The problem that existed here was to find some way to identify these groups. In discussions with personnel in the Performance Analysis Branch at Warner Robins, it was found that a computerized effectiveness report was produced monthly. This report was examined to see if it could provide adequate information for selecting the high and low performing organizations.

The total effectiveness score for each RCC was determined by computing the ratio of all earned hours with actual hours. There were three general categories for which hourly data were obtained: direct labor, indirect labor, and non-labor hours. Direct labor pertained to the work relating to the actual output products for which the RCC was responsible. Indirect labor included time pertaining to: supervision; clerical and administrative tasks; direct labor lost due to weather, lack of materials, lack of work, etc.; time spent in classroom training; union activities; and all hours not reported in the other two categories. Non-labor hours were those relating to time away from work. These included annual leave, sick leave, and leave without pay.

Actual hours were determined from time cards which showed the actual time spent by each individual in the various activities. Earned hours were based on

standards developed for each different activity. For direct labor hours, these are commonly referred to as "book time." Each of the standards were reviewed every six months for applicability. All earned and actual hours were summed for each RCC at the end of each month, and a score called percent effectiveness was computed by dividing total earned hours by total actual hours. These scores usually ranged between 75 and 115.

Although the effectiveness score was based primarily on the productivity of each organization, it seemed that this would still be adequate for determining which units might be in the sample. The decision was made to use this report as the basis for selecting the units to be sampled.

Because of possible fluctuations in workload from month to month, a four month average effectiveness score was computed for each maintenance unit. It was felt that this average score would be more representative of actual effectiveness than a single monthly score because of possible workload variances from time to time.

A meeting was then set up with the heads of each of the four maintenance divisions in which the objectives of the research were presented, and the units to be sampled were identified. The heads of two of the divisions (the gyro and precision equipment division and the

industrial products and life support systems division) requested that a unit of average effectiveness also be sampled from their divisions and that a copy of the anonymous responses from their units be provided to them for their own use. This was agreed to, and the total number of units to be sampled was raised from eight to ten.

The identification of the ten units sampled were coded as follows:

First digit	A--aircraft maintenance unit
	E--electronics unit
	G--gyro and precision equipment unit
	S--industrial products and life support units

Second digit	1--high performing unit
	2--average performing unit
	3--low performing unit

The average effectiveness, in rank order, and the number of responses obtained from each of the units in the sample are shown in Table 2-5.

The 385 responses were obtained strictly from volunteers in each of the units. No more than fifty questionnaires were distributed in each unit since it was felt that this amount would be more than adequate to

measure the feelings and perceptions of workers in any one group. The actual number of responses obtained from each RCC varied because workers in certain high security and clean-room areas were more difficult to contact, and partly because of the relatively small size of some of the units. Since the questionnaires were only distributed to volunteers, a "percent of response" figure is not applicable.

TABLE 2-5
AVERAGE EFFECTIVENESS SCORES AND NUMBER
OF RESPONSES FROM EACH SAMPLE UNIT

Unit	Average Effectiveness Score	Number of Responses
G1	109.25	19
E1	108.50	50
S1	100.75	30
S2	96.75	40
G2	93.50	42
A1	90.50	49
S3	90.25	23
E3	87.56	49
G3	85.50	34
A3	79.75	49
Total		385

In any questionnaire a certain amount of bias will be present. Many individuals volunteer either

because they are unhappy with or well satisfied with their organizations. Since the primary purpose of this study was to look for associations between the feelings of the workers about their jobs and the collective performance of the group, any bias that may be present in the responses actually enhances the process of identifying these relationships. In this case, bias can be considered a plus factor.

This section has discussed how the sample was selected, how the data on both effectiveness and worker attitudes were obtained, and how both the factor analysis and canonical analysis techniques were used to search for relationships between the two sets of data. The actual analyses performed on the data that were collected are presented in Part III.

PART III

ANALYSES OF THE DATA

Basic Analysis of the Attitudinal Data

Prior to actually identifying the attitudinal dimensions indicated by the factor analysis and then performing a canonical analysis on those dimensions with the effectiveness measures, a brief examination of the data was in order to determine if there appeared to be sufficient differences among the responses to even merit additional analysis. The first task was to look at the mean responses to each of the attitudinal questions and to compare them with the mean responses for the high and low performing organizations as determined in the previous chapter. If there were obvious differences in the means then a search for patterns would be warranted. Table 3-1 lists these mean responses for each of the questions. The high three performing units were G1, E1, and S1; and the low three performing units were E3, G3, and A3. As can be seen, there does appear to be differences in the pattern of responses. These differences are shown below:

1. Both high and low units above mean--21
2. Both high and low units below mean--25
3. High above and low below mean--33
4. High below and low above mean--15

TABLE 3-1

COMPARISON OF MEAN RESPONSES TO THE
ATTITUDINAL QUESTIONS

Question	Overall Mean	High Three Units	Low Three Units
1	4.218	4.283	4.235
2	3.366	3.535	3.242
3	3.244	3.333	3.227
4	3.660	3.929	3.500
5	2.444	2.838	2.394
6	3.595	3.828	3.455
7	4.016	4.131	3.848
8	3.543	3.778	3.326
9	3.899	4.051	3.902
10	3.571	3.596	3.568
11	4.101	4.192	4.098
12	3.984	4.141	4.045
13	4.514	4.444	4.583
14	3.901	3.869	3.727
15	2.249	1.970	2.508
16	4.405	4.485	4.242
17	3.226	3.152	3.189
18	2.906	3.040	2.803
19	2.613	2.485	2.568
20	3.683	3.879	3.659
21	3.574	3.778	3.508
22	3.940	4.000	4.030
23	3.727	3.843	3.780
24	3.034	2.737	3.174
25	3.197	3.192	3.023
26	3.475	3.374	3.455
27	4.068	4.101	3.955
28	2.805	2.808	2.833
29	3.834	3.848	3.689
30	3.086	3.293	3.030
31	2.543	2.677	2.614
32	3.431	3.727	3.280
33	4.288	4.202	4.212
34	2.395	2.141	2.470
35	3.558	3.495	3.447
36	3.709	3.626	3.621
37	3.291	3.364	3.500
38	4.031	3.677	4.083
39	2.992	3.182	3.144
40	3.636	3.737	3.492

TABLE 3-1--Continued

Question	Overall Mean	High Three Units	Low Three Units
41	3.429	3.202	3.379
42	3.270	3.040	3.000
43	2.382	2.333	2.523
44	3.790	3.828	3.674
45	3.135	2.939	2.932
46	3.109	3.152	2.894
47	3.566	3.434	3.462
48	3.275	3.323	3.212
49	3.969	4.010	3.856
50	3.174	2.980	3.083
51	4.416	4.404	4.318
52	4.288	4.212	4.167
53	4.125	4.040	4.091
54	3.823	3.980	3.750
55	3.745	3.707	3.636
56	3.912	3.747	3.955
57	3.842	3.727	3.841
58	3.312	3.232	3.288
59	3.151	3.323	3.076
60	3.164	3.293	3.076
61	3.078	2.939	3.053
62	4.429	4.434	4.364
63	3.564	3.606	3.614
64	3.771	3.909	3.735
65	3.096	3.212	3.129
66	3.491	3.253	3.318
67	3.964	3.818	4.000
68	4.234	4.222	4.258
69	3.195	3.222	3.030
70	3.704	3.808	3.727
71	3.766	3.677	3.962
72	2.138	2.202	2.152
73	3.423	3.242	3.689
74	4.008	4.030	3.955
75	2.740	2.556	2.727
76	3.590	3.727	3.576
77	3.595	3.697	3.667
78	3.177	3.253	3.136
79	2.618	2.556	2.727
80	2.766	2.586	2.871
81	3.153	2.879	3.053
82	3.639	3.646	3.742
83	3.384	3.424	3.341
84	3.213	3.192	3.235
85	3.504	3.465	3.402
86	4.208	4.364	4.174

TABLE 3-1--Continued

Question	Overall Mean	High Three Units	Low Three Units
87	2.699	2.778	2.735
88	3.665	3.859	3.720
89	3.145	3.212	3.212
90	3.327	3.414	3.424
91	3.338	3.394	3.447
92	2.722	2.717	2.818
93	2.956	3.000	2.932
94	3.361	3.343	3.348

An interesting aspect of this comparison is that in almost one-half of the questions (46 out of 94) both the high and the low performing organizations were on the same side of the overall mean. There does not, therefore, seem to be a simple inverse relationship between the attitudes of the different performance units. Since a more complicated pattern was indicated, a factor analysis was performed to attempt to aggregate basic underlying constructs.

A factor analysis of the ninety-four questions relating to worker attitudes was performed using subprogram FACTOR contained in the Statistical Package for the Social Sciences, version 6.0. The standard VARIMAX rotation option was performed after the principal-component matrix was computed. The number of factors to be extracted was determined by establishing a minimum acceptable eigenvalue

of 1.0 for each factor. This procedure produced twenty-four factors which explained 66.4 percent of the variance in the data. Table 3-2 shows the eigenvalue and percent of variance associated with each.

TABLE 3-2
EIGENVALUE AND PERCENT OF VARIANCE
ASSOCIATED WITH EACH FACTOR

Factor	Eigenvalue	Percent of Variance	Cumulative Percent
1	22.25	23.7	23.7
2	3.76	4.0	27.7
3	3.55	3.8	31.5
4	2.96	3.1	34.6
5	2.76	2.9	37.5
6	2.37	2.5	40.1
7	2.07	2.2	42.3
8	2.02	2.2	44.4
9	1.79	1.9	46.3
10	1.61	1.7	48.0
11	1.49	1.6	49.6
12	1.48	1.6	51.2
13	1.43	1.5	52.7
14	1.34	1.4	54.1
15	1.29	1.4	55.5
16	1.26	1.3	56.9
17	1.24	1.3	58.2
18	1.20	1.3	59.5
19	1.16	1.2	60.7
20	1.14	1.2	61.9
21	1.11	1.2	63.1
22	1.08	1.1	64.2
23	1.05	1.1	65.4
24	1.02	1.1	66.4

Before the actual interpretation of these 24 factors was attempted, a profile of the ninety-four variables against the twenty-four factors was developed. This profile indicates which of the variables are most discriminating. Ideally, each question would load highly on only one factor. This, of course, does not usually happen. The actual profile appears in Table 3-3.

TABLE 3-3
VARIABLE-FACTOR PROFILE

Variable	Factors	Variable	Factors
1	1, 20, 21	25	8
2	21	26	11, 12, 13, 15
3	21	27	3, 5, 11
4	1, 21	28	18
5	1, 11	29	3, 5, 16
6	1, 21	30	1, 6
7	10, 11, 21	31	10, 15, 16, 23
8	1, 21	32	3, 6
9	6, 10, 13, 21	33	9, 10, 19
10	1, 24	34	7
11	13	35	8
12	6, 13	36	11
13	6, 13, 17	37	12, 23
14	1, 5	38	8, 12
15	5	39	23
16	6, 11, 13, 14	40	3, 12, 22
17	8	41	19
18	8	42	16, 19
19	20	43	3, 18
20	1, 20	44	3, 18
21	1	45	12
22	1, 20	46	9, 11, 16, 19
23	1	47	10, 14, 15, 17
24	7, 18, 24	48	10, 17

TABLE 3-3--Continued

Variable	Factors	Variable	Factors
49	5, 8, 11, 16, 21, 24	72	7, 8, 12, 18, 19
50	9, 10, 12, 16	73	15
51	5	74	14, 24
52	5	75	7, 17, 20, 24
53	5	76	22
54	5, 18, 21, 23	77	22
55	5	78	22
56	9, 11, 19 n	79	17
57	4, 9	80	17, 24
58	4	81	10
59	4	82	6, 8, 12, 22
60	4	83	22
61	4	84	2, 22
62	4, 5, 6, 14, 15	85	16, 22
63	6	86	14
64	6	87	2
65	6	88	1, 2, 12, 22
66	16, 22	89	2
67	5, 6, 8, 11, 22	90	2, 12, 22
68	6, 9, 10, 16, 17, 22	91	12, 18, 22, 24
69	22	92	2
70	9	93	2
71	9, 24	94	8

In general, most of the questions seemed to load highly on only a few factors. Only seventeen of the variables loaded highly on four or more factors. This result was encouraging, and the analysis proceeded to the factor identification stage.

Identification of the Dimensions
of the Attitudinal Data

Once the twenty-four underlying factors were isolated, the next step was to attempt to identify what each of the factors represented. The procedure used was to list the questions according to their factor loadings on each of the factors, and then to attempt to determine what element each of the questions which loaded highly on each specific factor had in common. The common element, which was subjectively identified, was then considered to be a dimension of the attitudinal data. Although the number of questions analyzed varied from factor to factor, in no case was a question used that had a correlation less than .20. The following factors are presented in decreasing order of the percent of variance they explain. The complete factor matrix is contained in Appendix C.

Factor 1

<u>Loading</u>	<u>Question</u>
.74	23. My supervisor understands human relations.
.72	22. My supervisor is a capable individual.
.71	20. My supervisor is well qualified for his job.
.70	21. My supervisor tries to strike a balance between people needs and production needs.
.69	6. My supervisor shows interest in me as an individual.
.64	14. My supervisor knows when I do a good job.
.57	10. I am helped in correcting errors I make.
.57	4. My supervisor tells me how my job contributes to meeting production goals.
.55	1. My supervisor takes time to listen to job problems.
.54	88. My supervisor knows and understands the problems I have in doing my job.

Of all the factors, this one was certainly the most clear. The questions all relate to the individual's supervisor and contain such key words as: understands, capable, qualified, strikes a balance, shows interest, knows, helps, listens, and understands. Factor 1 clearly appears to be measuring the individual's attitude about the quality of supervision he receives.

Factor 2

<u>Loading</u>	<u>Questions</u>
.75	89. Right decisions are made at upper levels of supervision.
.75	93. Decisions are made at the proper level of supervision.
.71	87. Upper levels of management understand the problems I face in doing my job.
.65	92. Decision makers at the director level are aware of lower level problems.
.57	90. Right decisions are frequently made at intermediate levels of supervision.
.56	84. Communication between my RCC and the division is good.
.47	17. Identified job problems are quickly resolved by management.
.45	94. Meaningful organizational goals have been established for work.
.40	91. Right decisions are made at lower levels of management.

These questions all appear to be related to decision making. Questions 89, 93, 90, and 91 all pertain to the level at which the decision is made, while the others seem to be related to the flow of information that is needed to make a proper decision. The combination of the two would indicate that this factor is probably

measuring the worker's feeling about the general decision making structure within the total organization.

Factor 3

<u>Loading</u>	<u>Question</u>
.69	32. My work assignment is challenging.
.59	27. I gain satisfaction from the performance of my job.
.57	37. I would encourage others to seek a job like mine.
-.54	43. I dread going to work.
.53	40. Few parts of my job should be changed.
.51	44. My job is very satisfactory.
.49	29. My job provides me with a feeling of achievement.
.47	69. My job is interesting and demanding.
.43	46. My skills and abilities are being used to the fullest in my present job.
.40	74. My skills fit the job.

The common element in this set of questions seems to pertain to the job itself. The negative sign on the factor loading of question 43 indicates that the individual does not dread going to work and, therefore, either looks forward to going to work or is at least neutral on the subject. While all the questions seemed to imply satisfaction with the job, it was possible to become more specific. When the word "challenging" in question 32 and the term "satisfaction from the performance of" in question 27 were combined with question 40, it appeared that the actual tasks or functions of the job provided a further delineation of the common element. This suggested that the more specific identification of this factor was

that it was the satisfaction with the job content that was being measured. This specificity was needed since other factors were also related to job satisfaction.

Factor 4

<u>Loading</u>	<u>Question</u>
.79	60. Equipment needed to accomplish the job is available.
.72	58. I can obtain tools when they are needed.
.71	59. The equipment is maintained well.
.65	61. I can obtain the parts I need to do my job.

There was little problem in arriving at the meaning of this factor even though only four questions had loadings greater than .40. The rather clear indication was that this factor was measuring how the individual felt about the availability of equipment.

Factor 5

<u>Loading</u>	<u>Question</u>
.81	52. I feel a sense of responsibility on my job.
.81	53. I enjoy a feeling of responsibility on my job.
.60	51. I feel responsible for my own efforts at work.
.53	55. Time passes quickly for me on the job.
.50	54. I am allowed to use my own judgment on the job.

Once again, there were relatively few high loadings, but the meaning was still clear. The common element among this set of questions lies in the area of the degree of responsibility the individual believes he has in his job.

Factor 6

<u>Loading</u>	<u>Question</u>
.71	63. I understand how my production output is measured.
.70	12. I understand how the quality of my work is measured.
.67	65. I understand how the output of my unit is measured.
.57	13. I know the quality standards required for my work.
.47	68. I know how much work I am expected to do.
.24	66. I am involved in establishing my production goals.
.23	82. Work responsibilities within my RCC are clearly defined.
.23	9. I am allowed to see the results of my work.
.22	30. I get recognition when deserved.

Each of the above appears to be related to the clarity or understanding of organizational expectations. They pertain to the establishment and measurement of both quantity and quality goals. The general emphasis seems to be on the flow of information within the organization. As such, the common element may be defined as the way the worker feels about the degree of communication that exists.

Factor 7

<u>Loading</u>	<u>Question</u>
.72	15. My job is oversupervised.
.59	34. I feel I need more freedom in my job assignment to get the work done.
.50	24. I feel that pressure is used to obtain increased production.
.46	72. If I had more work I would not take as much short term leave.
.40	75. The method I use to inspect and assemble the end item can be improved.

Questions 15 and 34 are both related to the amount of supervision and control that the worker is subjected to. The pressure referred to in question 24 is most frequently applied through the supervisor; the amount of work in question 72 is usually assigned by the supervisor; and the room for improvement in question 75 can be considered a function of supervision and freedom as used in questions 15 and 34. The general feeling that seems to be common in these questions is one that pertains to the quantity of supervision that the individual receives. It is interesting to note that the quality and the quantity of supervision have generated two distinct factors. This provides support for the notion that specific dimensions of workers' attitudes pertaining to supervision can be measured as opposed to more general or global ones.

Factor 8

Loading

Questions

.59	35.	Production schedules in my work area are realistic.
.54	25.	Decisions which affect my job are frequently based on technical or engineering analyses.
.47	94.	Meaningful organizational goals have been established for work.
.38	38.	If given the opportunity, I would cross train to a different job at the same pay rate.
.37	72.	If I had more work I would not take as much short term leave.
.30	67.	The quality standards for my work are reasonable.

<u>Loading</u>	(cont)	<u>Question</u>
.25	17.	Identified job problems are quickly resolved by management.
.23	18.	I am kept informed of why some problems are not resolved quickly.
.23	82.	Work responsibilities within my RCC are clearly defined.
.21	49.	I have the necessary authority to carry out my job.

The first three questions for this factor pertain to realistic schedules, carefully thought out decisions, and meaningful goals. If the next two questions are by-passed (questions 38 and 72), the remaining ones relate to reasonable quality standards, quick resolution of problems, being kept informed, clearly defined responsibilities, and possession of needed authority. These all contain some type of managerial action as a common element. Additionally, the terms realistic, meaningful, reasonable, quickly resolved, kept informed, clearly defined, and necessary, indicate that the actions are thought of in a positive manner. The factor, therefore, seems to be measuring the individual's degree of agreement with decisions or confidence in managerial judgment.

In factor analysis, seemingly unrelated or spurious elements may appear from time to time. This is especially true once the major factors (relatively high eigenvalues) have been extracted. In these cases, one can either search for some complicated relationship or consider the element

spurious and not include it in the search for a common meaning. Questions 38 and 72 were, therefore, not included in the analysis process.

Factor 9

<u>Loading</u>	<u>Question</u>
.69	70. I know how to reduce the cost of the units I produce.
.60	71. Material waste can be reduced in my work area.
-.34	33. There is ample workload to maintain the desired production rate.
-.33	50. I have all the responsibility I want.
-.31	46. My skills and abilities are being used to the fullest.

The negative loadings with questions 33, 50, and 46 imply that: there is not ample workload; the worker does not have all the responsibility he wants; and skills and abilities are not used to the fullest. The combination of these with positive indications for a reduction in both production costs and material waste suggests that the common element within the questions pertains to job efficiency.

Factor 10

<u>Loading</u>	<u>Question</u>
.71	81. I feel that time clocks are necessary for the people in my RCC.
.38	50. I have all the responsibility I want.
.34	48. I have the chance to continually learn something worthwhile.
.31	33. I have ample workload to maintain the desired production rate.
.29	31. My present job assignment offers the opportunity for future advancement.

The meaning of this factor was one of the more difficult to interpret. The relatively high loading on the time clock question combined with the lower correlated questions on responsibility, chance to learn, workload, and advancement opportunity did not provide a readily apparent common element. After considerable discussion and thought it was decided to describe this factor as one which seemed to indicate the amount of job commitment felt by the individual. This was, admittedly, a highly subjective decision, but, one which seemed to fit the questions better than any other.

Factor 11

<u>Loading</u>	<u>Question</u>
.59	36. My job description reflects the assignments I am given.
.41	56. My job instructions are clear and easy to follow.
.30	26. I feel secure in my job.
.30	57. The procedures I am asked to follow seem reasonable.
.27	16. My supervisor has confidence in my ability to perform my job.
.24	27. I gain satisfaction from the performance of my job.

Each of the above relates to the job in some positive manner. They refer to the fit between job descriptions and assignments, clear instructions, job security, reasonable procedures, supervisory confidence in one's ability, and satisfaction obtained from job performance. These rather clearly indicate that the

dimension being measured is the degree of overall job congruency that is perceived to exist.

Factor 12

<u>Loading</u>	<u>Question</u>
-.70	45. My grade level is too low for the work I do.
.34	91. I feel that the right decisions are made at lower levels of management.
.25	37. I would encourage others to seek a job like mine.
-.24	38. If given the opportunity, I would cross train to a different job at the same pay rate.
.24	82. Work responsibilities are clearly defined.
.24	90. Right decisions are made at intermediate levels of supervision.
.23	26. I feel secure in my job.
.22	40. Most of my job should not be changed.
.22	88. I feel my immediate supervisor knows and understands the problems I have in doing my job.
.21	50. I have all the responsibility I want.

The relatively high negative loading on question 45 implies that the individual feels his grade level is not too low for his job. The other questions generally infer satisfaction with the job. This combination suggests that it is the satisfaction with the job level that is being measured.

Factor 13

<u>Loading</u>	<u>Question</u>
.67	11. I help set my own quality goals.
.42	9. I am allowed to see the results of my work.
.33	12. I understand how the quality of my work is measured.
.29	16. My immediate supervisor has confidence in my ability to perform my job.

Loading (cont)

Question

- | | | |
|-----|-----|---|
| .29 | 26. | I feel secure in my job. |
| .25 | 25. | I feel that decisions which affect my job are based on technical or engineering analyses. |

The most important question in this factor pertains to the establishment of quality goals. The others relate to these goals in one manner or the other. There was little problem, therefore, in identifying the factor as one measuring the feeling of the worker about his degree of participation in establishing quality standards.

Factor 14

Loading

Question

- | | | |
|-----|-----|---|
| .82 | 86. | I frequently complete difficult jobs successfully. |
| .40 | 74. | Most of my job could not be done by someone with less skill than I. |
| .30 | 62. | I am determined to meet my job commitments. |
| .30 | 84. | Communication between my RCC and the Division are good. |
| .29 | 82. | Work responsibilities within my RCC are clearly defined. |
| .25 | 16. | My immediate supervisor has confidence in my ability to perform my job. |

Again, a highly loaded question is followed by several supporting questions relating to it. In this case, question 86, which asks about the completion of more difficult jobs, is followed by questions that can easily be considered complimentary. It appears that the worker's perception of his individual ability adequately defines this set of questions.

Factor 15

<u>Loading</u>	<u>Question</u>
.80	73. I feel additional technical training would improve my chances for promotion.
.29	31. My present job assignment offers the opportunity for future advancement.
.27	26. I feel secure in my job.
-.23	47. I receive the necessary amount of training to do my job well.
.23	62. I am determined to meet my job commitments.

The training/advancement relationship seems to be what is being measured with this factor. Certainly question 73 indicates that the worker believes there is a definite relationship. Question 31 provides the opportunity for advancement; question 26 provides the sense of well being, or confidence; question 47 provides the rationalization that the reason the individual has not already been promoted is because of the lack of training; and question 62 provides the determination.

Factor 16

<u>Loading</u>	<u>Question</u>
.72	42. I help to set the goals of my work unit.
.63	66. I am involved in establishing my production goals.
.34	50. I have all the responsibility I want.
.25	85. I am working at my full capacity.
.23	49. I have the necessary authority to carry out my job.
.23	68. I know how much work I am expected to do.
.22	46. My skills and abilities are being used to the fullest in my present job.
.21	29. I have a feeling of achievement in my job.

Questions 42 and 66 both consider the worker's participation in setting production goals. The remaining questions indicate the feelings one obtains from being involved in the goal setting process. It is interesting to note that participation in setting production goals is associated more with the terms responsibility, full capacity, authority, expectations, abilities, and a feeling of achievement; while participation in establishing quality standards (Factor 13) is more closely associated with the worker's perception of his job security and his supervisor's confidence in him. It would appear that participation in different job related areas is associated with different feelings within the worker.

Factor 17

<u>Loading</u>	<u>Question</u>
.75	79. I feel that my fellow workers frequently abuse their sick leave.
.56	75. The method I use to inspect and assemble the end item can be improved.
-.26	13. I know the quality standards required for my work.
-.22	68. I know how much work I am expected to do.
-.21	48. I often have the chance to learn something worthwhile.
.21	80. Employees in my area have difficulty in relating their work effort to physical output and/or services.
-.20	47. I receive the necessary amount of training to do my job well.

The negative loadings for questions 13, 68, 48, and 47 suggest that the individual feels he does not

know the required quality standards; he does not know how much he is expected to do; he does not often learn something worthwhile; and he does not receive the needed training. The combination of these with the stronger feelings that sick leave is frequently abused and that methods can be improved indicates that the factor is measuring general job dissatisfaction.

Factor 18

<u>Loading</u>	<u>Question</u>
.73	28. I frequently feel unable to use my full capabilities in the performance of my job.
-.25	44. Everything considered, my job is very satisfactory.
-.25	72. If I had more work I would not take as much short term leave.
.24	24. I feel that pressure is used to obtain increased production.
.23	54. I am allowed to use my own judgment on the job.
.22	43. I dread going to work.
.22	91. I feel that right decisions are often made at lower levels of management.

The key element in this factor seems to be the inability to perform at one's full ability. Again, the negative signs reverse the meanings of those questions to which they apply. This implies that the job is unsatisfactory and that more work would not decrease the amount of short term leave taken. Since the individual feels he can use his own judgment and the correct decisions are frequently made, the reason for the dissatisfaction

must be due to something else. It appears, then, that it is primarily the worker's dissatisfaction with the difference between the capabilities he possesses and the capabilities demanded in the job. The common element being expressed through this set of correlations has, therefore, been labeled as dissatisfaction with job fit.

Factor 19

<u>Loading</u>	<u>Question</u>
.72	41. There are constraints to good production in my job.
-.31	33. There is an ample workload to maintain the desired production rate.
.29	42. I help set the goals of my work unit.
.25	46. My skills and abilities are being used to the fullest at my present job.
.21	72. If I had more work I would not take as much short term leave.
.20	34. I feel I need more freedom in my job assignment to get the work done.
-.20	56. My job instructions are clear and easy to follow.

The presence of questions 42 and 46 among those with high loadings on this factor cannot be readily explained. They seem to be inconsistent with the other questions although it is possible that some complicated association does exist. They were, however, considered spurious and were not used in identifying the factor. Interpretation of this factor was accomplished, primarily, through question 41 which states that the individual believes there are constraints to production. The

remaining questions further delineate these constraints as including lack of work, too rigid procedures, and too complicated instructions.

Factor 20

<u>Loading</u>	<u>Question</u>
-.69	19. My supervisor spends too much time away from his work area.
.31	1. My supervisor takes time to listen to job problems.
.29	20. My supervisor is well qualified for his job.
.29	22. My supervisor is a capable individual.
-.22	75. The methods I use to inspect and assemble the end item can be improved.

Although the questions in this factor relate to different aspects of the supervisor, the more heavily loaded ones relate to time. Question 19, with the negative loading, states that the supervisor does not spend too much time away from his work area; and question 1 states that he is available to listen to problems. The main thrust of this factor, therefore, appears to lie in the area of the availability of the supervisor. This factor complements those previously identified as quantity and quality of supervision.

Factor 21

<u>Loading</u>	<u>Question</u>
.75	2. My immediate supervisor uses my ideas on how to improve my job.
.68	3. My immediate supervisor uses my suggestions in job related problem solving.
.41	7. My supervisor gives me responsibility in line with my abilities.

Loading (cont)Question

- | | | |
|-----|-----|---|
| .31 | 1. | My supervisor takes time to listen to job problems. |
| .30 | 6. | My supervisor shows interest in me as an individual. |
| .27 | 9. | I am allowed to see the results of my work. |
| .26 | 4. | My immediate supervisor tells me how my job contributes to meeting shop production goals. |
| .24 | 49. | I have the necessary authority to carry out my job. |
| .23 | 8. | I am satisfied with the feedback I receive in doing my job. |
| .20 | 54. | I am allowed to use my own judgment on the job. |

Most of these questions involve both the supervisor and the worker. In questions 2 and 3 the supervisor uses the worker's ideas and suggestions; in question 7 the supervisor gives the worker responsibility; in question 6 he shows interest in the worker; and in question 4 he tells the worker how his job contributes to goals. The other questions relate more directly to the worker in that he is allowed to see results; he has needed authority; he is satisfied with feedback; he uses his own judgment. All the questions indicate a positive feeling between the supervisor and worker. Therefore, the logical indication is that the factor is measuring worker/supervisor cohesiveness.

Factor 22

<u>Loading</u>	<u>Question</u>
.76	77. I feel my fellow workers are supporting the production effort in my shop.
.66	78. I feel my fellow workers are working at their full capacity.
.63	76. The people in my RCC work effectively as a team.
.48	83. Communication within my RCC is good.
.42	82. Work responsibilities within my RCC are clearly defined.

Whereas factor 21 emphasized worker/supervisor relationships, this factor seems to concentrate on worker/fellow-worker relationships. Again, the responses are positive, indicating that, in this case, it is the group cohesiveness that is being measured.

Factor 23

<u>Loading</u>	<u>Question</u>
.75	39. I would follow my job to another location in the continental United States.
.24	54. I am allowed to use my own judgment on the job.
.23	37. I would encourage others to seek a job like mine.
.22	31. My present job assignment offers the opportunity for future advancement.

All four of these questions indicate a general satisfaction with the job. Because of the relatively high loading on the relocating question, however, it was decided that the most descriptive identification of the factor would be in the area of the worker's willingness to relocate.

Factor 24

<u>Loading</u>	<u>Question</u>
.68	80. Employees in my area have difficulty in relating their work effort to physical output and/or services.
.32	10. I am helped in correcting errors I make.
.30	74. Most of my job requires my skill level.
-.25	24. I feel that pressure is used to obtain increased production.
.24	75. The method I use to inspect and assemble the end item can be improved.
-.23	49. I have the necessary authority to carry out my job.
.23	71. Material waste can be reduced in my work area.
.20	91. Right decisions are frequently made at lower levels of management.

Question 80, which had the highest loading, provided the key to identifying this factor as pertaining to the worker's feelings about his effort/performance relationship. An examination of the other questions shows that they can be related either to the effort of the worker, his performance, or both.

While the identification of the above twenty-four factors was, admittedly, highly subjective, they do seem reasonable and in line with similar studies. Although other interpretations of these factors are certainly possible, the ones presented here appear acceptable and will be used in the canonical portion of the analysis. The identified factors are listed in Table 3-4.

TABLE 3-4

DIMENSIONS OF THE ATTITUDINAL DATA

-
-
1. Quality of supervision
 2. General decision-making structure
 3. Satisfaction with job content
 4. Availability of equipment
 5. Responsibility
 6. Communication
 7. Quantity of supervision
 8. Confidence in managerial judgment
 9. Job efficiency
 10. Job commitment
 11. Job congruency
 12. Satisfaction with job level
 13. Participation in establishing quality standards
 14. Individual ability
 15. Training-advancement relationship
 16. Participation in setting production goals
 17. General job dissatisfaction
 18. Dissatisfaction with job fit
 19. Constraints to production
 20. Availability of the supervisor
 21. Worker-supervisor cohesiveness
 22. Group cohesiveness
 23. Willingness to relocate
 24. Effort-performance relationship
-

Comparison of the Worker's Perceptions of
Effectiveness with Actual Performance

To support the contention that effectiveness could be adequately measured from the responses of the workers to the eight effectiveness questions in the questionnaire, a comparison was made between their responses and the computerized effectiveness ratings provided by the Performance Analysis Branch at Warner Robins ALC. The

mean response to each effectiveness question was computed using the three highest performing organizations (G1, E1, and S1) and then the three lowest performing organizations (E3, G3, and A3). Table 3-5 shows the mean responses in each group.

TABLE 3-5
COMPARISON OF MEAN RESPONSES TO THE EFFECTIVENESS
QUESTIONS BETWEEN THE HIGH THREE AND
THE LOW THREE PERFORMING UNITS

Question	High Three Units	Low Three Units
Quantity	3.75	3.56
Quality	3.96	3.86
Efficiency	2.44	2.32
Anticipation	3.27	3.21
Awareness	2.44	2.36
Promptness	3.87	3.60
Prevalence	2.60	2.26
Flexibility	2.98	2.80

It can be seen that in every case the mean response to each of the effectiveness questions was higher in the top three units than in the lower three.

With this encouraging result it was then decided to make the same comparison using the responses from all of the units. The responses from S2 and G2 were added to the higher group, and the responses from A1 and S3 were added to the lower. The mean responses of the top five

and the lower five units are shown in Table 3-6. Again, the responses were consistently higher in the higher rated group. These results provide rather clear support for the assertion that the perceptions of individuals concerning the effectiveness of their unit does indicate how well that organization actually performs.

TABLE 3-6
COMPARISON OF MEAN RESPONSES TO THE EFFECTIVENESS
QUESTIONS BETWEEN THE HIGH FIVE AND THE
LOW FIVE PERFORMING UNITS

Question	High Five Units	Low Five Units
Quantity	3.70	3.50
Quality	3.92	3.75
Efficiency	2.46	2.41
Anticipation	3.27	3.17
Awareness	2.51	2.38
Promptness	3.73	3.60
Prevalence	2.60	2.36
Flexibility	2.90	2.79

Identification of the Canonical Relationships

As stated in Part I, the principal purpose of this study was to determine whether relationships exist between specific dimensions of worker attitudes and specific criteria of organizational effectiveness. To accomplish this, the data were subjected to a canonical

analysis using subprogram CANCERR contained in the Statistical Package for the Social Sciences, version 6.0. The output from this program is contained in Appendix D. Five multivariate relationships were found between the sets of attitudinal and effectiveness data in which the significance of the canonical correlation was .001 or better. Each of these is discussed below. Only the major variables associated with each set of variates have been extracted from Appendix D. The coefficients have all been made positive for clarity. It should be pointed out that no inference of causality is intended in the discussion of the relationships which follows. The purpose of this section is to identify the significant relationships that exist among the variables and not to imply that the attitudes cause the performance or vice-versa. The relationships are presented in decreasing order of the amount of variance in the data that they explained. The numbers next to the first set of variables indicate the applicable question in the questionnaire, and the numbers in the second set of variables refer to the attitudinal factors.

Relationship 1

<u>Loading</u>		<u>Variable</u>
.37	101.	High awareness of new techniques
.33	99.	High efficiency
.33	100.	High anticipation of problems
-	-	-
.54	1.	High quality of supervision
.43	22.	High group cohesiveness

This relationship was by far the strongest, accounting for 44 percent of the variance in the data. The indication is that an organization in which the workers feel there is high quality supervision and high group cohesiveness is also one which: appears to be highly efficient; has little difficulty in anticipating problem areas and solving them satisfactorily; and is knowledgeable of the latest state of the art developments in its field.

Also of considerable interest is the fact that the quantity of output had a loading of $-.05$, and the flexibility question had a loading of $.007$. This implies that quality of supervision and group cohesiveness have practically no relationship to production quantity or to the group's ability to cope with emergency situations. Other variables are much more important in these effectiveness areas.

Relationship 2

<u>Loading</u>		<u>Variable</u>
.77	97.	High output quantity
.58	102.	Slow adjustment to new methods
.53	99.	High efficiency
-	-	-
.53	14.	Low individual ability
.39	12.	Dissatisfaction with job level
.38	17.	General job satisfaction

The canonical correlation of this set of variates was .49 which means that 24 percent of the remaining variance was explained by this relationship. An examination of the higher loaded variables in each set suggests that groups containing workers who feel they have relatively low ability and are dissatisfied with the level of their jobs but are satisfied otherwise, tend to be groups which have high output quantity coupled with high efficiency but which also seem slow to adjust to new procedures and concepts.

One way to explain this relationship is to look at each of the effectiveness variables separately. It must be remembered, however, that the inference is not that low ability is related to high output, for example, but that low ability combined with the other attitude variables is related to high output quantity combined with the other effectiveness variables. The relationship is

between the sets, not between the individual variables. With this in mind, one can then proceed to suggest how one effectiveness variable might be explained by the attitude variables.

High output quantity might exist if:

- a. low perceived ability resulted in strict adherence to production procedures without consideration of quality or improving methods and
- b. there was a desire to move into a higher level job, and the way to accomplish that was through showing that one was capable of producing well at his current job level, and
- c. other aspects of the job and the environment were satisfactory.

Slow adjustment to new methods might exist if:

- a. low ability required additional training and practice to acquire the skills necessary to make a change, and
- b. dissatisfaction with the level of the job provided a greater concern with moving into a higher level job than with changing the current one, and
- c. satisfaction with the more general aspects of the job provided little real reason to change.

High efficiency might be obtained if:

- a. a relatively low ability resulted in strict adherence to procedures and the continued repetitive operations improved efficiency, and
- b. the path to a higher level job also included demonstration of efficiency in the lower job, and
- c. general job satisfaction led to improved performance.

The rationalization given above will not be presented for the remaining relationships. It was covered in this case, however, to show one way to go about explaining how the variables might fit together.

Relationship 3

<u>Loading</u>	<u>Variable</u>
.98	99. Low efficiency
.53	97. High output quantity
.47	104. High flexibility
-	-
.44	18. Dissatisfaction with job fit
.43	8. Lack of confidence in management
.33	10. Low job commitment

The third set of variates had an eigenvalue of .177 which meant that it explained about 18 percent of the variance not previously explained by the first two sets. The indication in this relationship is that an organization which is low in efficiency, which produces a high quantity

of output, and which is also highly flexible in coping with emergency situations tends to have workers: who are dissatisfied with the demands of their jobs compared with their abilities, who lack confidence in the judgment of higher level management, and who have a low degree of commitment to their individual jobs.

It is interesting to note that in relationship 2 low individual ability and dissatisfaction with job level were related to high output quantity and high efficiency, where in this set of variates perceived low management ability and dissatisfaction with job fit are related to high output quantity and low efficiency. It would seem that efficiency varied according to whether it was individual or managerial ability that was low and whether it was job level or job fit that was causing the specific dissatisfaction.

A second interesting aspect is that high efficiency was coupled with slow adjustment to new ideas in relationship 2, while low efficiency was coupled with a high degree of flexibility in relationship 3. This might indicate that efficiency is inversely related to change, at least when the quantity of output is high.

Relationship 4

<u>Loading</u>		<u>Variable</u>
1.12	98.	High output quality
.77	100.	Poor anticipation of problems
-	-	-
.68	24.	Good effort-performance relationship
.32	18.	Dissatisfaction with job fit
.29	8.	High confidence in management
.28	12.	Dissatisfaction with job level

While the first three relationships had relatively high loadings on efficiency and quantity, this one seems to emphasize the quality of output. The correlations were significant (better than .001), and the relationship explained about 16 percent of the remaining variance.

The general indication is that high quality of output combined with poor anticipation of problems may most frequently be found in organizations in which most of the workers: feel their individual effort is directly related to the group's actual output; are dissatisfied with both their job fit and job level; and have a high degree of confidence in the judgment of higher management. It would seem that the high quality of output might be more logically related to the belief that effort leads to performance, while the poor anticipation of problems might relate more to the confidence in managerial judgment. If the workers feel management is highly competent, they may

not try to anticipate problem areas as much as they would otherwise. Since management is farther removed from the actual work environment, anticipation of problem areas might, understandably, be relatively low.

Dissatisfaction with both job fit and job level could conceivably explain the high quality if, again, good output was considered a path to either lateral or upward job movement. They could also explain the poor anticipation of problems if the expectation of moving to a different job were present. More will be said about job fit and job level after examining the final set of variates.

Relationship 5

<u>Loading</u>		<u>Variable</u>
.81	103.	High prevalence of adjustment
.68	101.	Low awareness of new techniques
.64	100.	Poor anticipation of problems
-	-	- - - - -
.35	18.	Satisfaction with job fit
.33	2.	Dissatisfaction with decision making structure

This final relationship was significant at the .001 level and explained approximately 15 percent of the variance left unexplained by the first four sets of variates. The more highly loaded variables suggest that the workers who are highly satisfied with the fit between their abilities and job requirements, but are not

satisfied with the general decision making structure, also tend to readily accept and adjust to changes, are not aware of the latest state of the art developments in their field, and do a rather poor job in anticipating problems. It would seem that if one feels he is in a job well suited to his particular needs and abilities that, although he may be quick to adjust to new methods once they are placed into effect, he may not desire to actively participate in the decision making processes actually leading to the implementation of that change.

The relationships presented above, while certainly not conclusive, do indicate some very discernible associations between specific effectiveness measures and specific attitudinal factors. Perhaps just as significant are relationships that are not supported by this analysis. As examples, the indications are that the quality of supervision is related to efficiency but not to the quantity or quality of output, and that dissatisfaction with certain aspects of the job (such as job level and job fit) tend to be related to high output quantity and quality rather than satisfaction in those areas.

Table 3-7 depicts the relationships that were found in the variables. All of the variables are referred to in positive form for greater ease of understanding. For example, the attitude dimensions

TABLE 3-7

RELATIONSHIPS BETWEEN DIMENSIONS OF WORKER ATTITUDES
AND MEASURES OF ORGANIZATIONAL EFFECTIVENESS*

Effectiveness Measures	Attitude Dimensions									
	Quality of Supervision	Decision-making Structure	Confidence in Management Judgment	Job Commitment	Satisfaction with Job Level	Individual Ability	General Satisfaction	Satisfaction with Job Fit	Group Cohesiveness	Effort-performance Relationship
Quantity			-3	-3	-2	-2	+2	-3		
Quality			+4		-4			-4		+4
Efficiency	+1		+3	+3	-2	-2	+2	+3	+1	
Anticipation	+1	+5	-4		+4			+4 -5	+1	-4
Awareness	+1	+5						-5	+1	
Promptness					+2	+2	-2			
Prevalence		-5						+5		
Flexibility			-3	-3				-3		

*The numbers refer to the relationship set in which the association was suggested, and the sign indicates the direction of that association.

pertaining to job fit and job level are labeled in terms of satisfaction instead of dissatisfaction. This removes possible confusion caused by double negatives. The numbers indicate in which relationship the association is found, and the sign indicates whether it was a direct or an inverse relation.

Each of the eight effectiveness measures appears in Table 3-7, but only ten of the attitude dimensions are associated with them. This does not mean that the other attitude dimensions are unimportant but only that they are not as strongly related to these particular effectiveness measures. The relationships which have emerged, however, do provide an initial insight as to where more specific studies might concentrate. The overall indication is that, at least for the ten dimensions discussed in this section, discernible relationships do exist between specific attitude dimensions and specific effectiveness criteria.

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PART IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER RESEARCH

Summary

The primary purpose of this exploratory research was to determine if discernible relationships could be found between specific measures of organizational effectiveness and specific dimensions of worker attitudes. Previous research in this area has often concentrated on either specific effectiveness criteria or on specific attitudinal dimensions (or measures of satisfaction) while using a rather global measure for the other. This study concentrated on identifying relationships that existed between specific measures of both. It was felt that much of the inconsistency in the findings of prior studies was caused, at least in part, by two factors. First, the use of a rather general measure for either worker satisfaction or organization performance made comparisons between studies acceptable only in the most general sense. Second, in most prior analyses the effect of the interrelationships between variables was lost, which meant that variables which were important contributors to the overall performance or satisfaction measure might not be found because of the

counterbalancing action of one or more other variables. The objective of this study was to isolate and identify some of these variables and then to search for more specific relationships between them. If this could be done, then follow-on studies of each relationship area might enhance the development of more definitive theories pertaining to organizational behavior and management practice.

The task that had to be accomplished was to determine what the variables should be, how to measure them, and then how to find relationships between them. A review of the literature showed that the more comprehensive concepts of organizational effectiveness encompassed the basic objectives of organizations as identified by Georgopoulos and Tannenbaum (10:534-40). These were in the areas of output, change, and preservation of resources. This multidimensional concept of organizational effectiveness was incorporated into a set of eight criteria of effectiveness in a study by Mott (21). These consisted of the following:

1. Quantity. The quantity of the output in terms of how much is being produced.
2. Quality. The quality of the output in terms of the degree of excellence or superiority.
3. Efficiency. The efficiency with which the output is produced in terms of achievement of the

greatest output for the least input.

4. Anticipation. Anticipating problems in advance and developing satisfactory and timely solutions to them.

5. Awareness. Staying abreast of new technologies and methods applicable to the activities of the organization.

6. Promptness. The acceptance of solutions in terms of how quickly people in the organization adjust to them.

7. Prevalence. The acceptance of solutions in terms of the proportion of the workers who readily adjust to them.

8. Flexibility. The ability of the organization to cope with temporally unpredictable situations (21:20).

Mott then developed a set of eight questions to measure each of these criteria. These questions were shown to be both valid and reliable measures of effectiveness and were selected as the effectiveness variables in this study. The actual questions appear in Appendix A.

Selection of the attitude variables proved to be a completely different matter. There was virtually no agreement in the literature as to which specific attitudes might be most important. In fact, there was even disagreement as to whether there was any significant relationship

between attitudes and performance at all. The more recent studies, however, did generally support the belief that such a relationship did exist. Most of these used some type of multivariate technique.

Since the more current studies reflect the multidimensionality of attitudes it seemed desirable to find a data collection instrument which contained a relatively large number of attitudinal questions. These data could then be "reduced" into a smaller set of more interpretable constructs using the generally accepted technique of factor analysis. An acceptable questionnaire was found that was already in use by the U. S. Air Force in several other projects relating to worker attitudes. This offered the advantage of making additional data available for subsequent research emanating from this study. This questionnaire was, therefore, used as the instrument for collecting the attitudinal data. Appendix B contains these ninety-four questions.

With the data collection vehicle established, the next step was to determine the sample population and selection criteria. The Maintenance Directorate at the Warner Robins Air Logistics Center was primarily a population of convenience which contained a broad spectrum of talents and technical proficiency. To provide as much

variance in the data as possible, the sample was chosen so as to include more individuals from high and low performing groups than from average ones. Four high, four low, and two average performing units were selected from the output of an automated effectiveness report produced by the Maintenance Directorate. The questionnaire was then administered to workers from these ten different organizations. A total of 385 useable responses was obtained.

To reduce the data gathered from the 94 attitudinal questions to a smaller number of more meaningful constructs, a factor analysis was performed on the responses. This procedure yielded twenty-four separately identifiable factors which were considered dimensions of the attitudinal data. These dimensions are listed in Table 3-4.

The search for relationships between these twenty-four attitudinal dimensions and the eight measures of organizational effectiveness was accomplished by performing a canonical analysis on the two sets of variables. This procedure provided sets of weights for the variables which indicated the strength of each variable in explaining correlations between the two composite sets. Five sets of independent and significant relationships were found. While these should not be

considered as conclusive evidence that the specific relationships do, in fact, exist; they should be taken as strong indications that further research in each specific area could lead to the discovery of more definitive and substantially stronger associations. The specific relationships are depicted in Table 3-7.

Existence of the five multivariate relationships between the set of attitude dimensions and the set of effectiveness measures was suggested by the fact that five significant canonical correlations were obtained. The strengths of these relationships were indicated by the squares of the canonical correlations (eigenvalues), and, most importantly, the nature of these canonical relationships was inferred from an examination of the sign and magnitude of each correlation coefficient assigned to the variables in the two sets of data (2:189; 26:69).

Of the twenty-four dimensions of the data which were extracted by the factor analysis, ten seemed more strongly related to the effectiveness measures than the others. They were, in order of explanatory power:

1. Quality of Supervision
2. Satisfaction with the Decision Making Structure
3. Confidence in Managerial Judgment

4. Job Commitment
5. Satisfaction with Job Level
6. Individual Ability
7. General Job Satisfaction
8. Satisfaction with Job Fit
9. Group Cohesiveness
10. Effort-Performance Relationship

The fourteen dimensions which were not as strongly related should not be considered unimportant or unassociated with effectiveness. It only means that in this study with the specific sample, techniques, and measures that were used, the ten dimensions identified above were dominant.

Each of the effectiveness measures had at least two and as many as eight of the attitudinal variables related to it. The specific relationships which were found are summarized below in their order of significance.

1. Organizations in which most workers felt there was:

- a high quality of supervision, and
- a high degree of group cohesiveness

were generally characterized as groups which:

-stayed abreast of new technologies and methods applicable to work activities, and

- were relatively efficient, and
- generally anticipated problems in advance and developed satisfactory and timely solutions to them.

2. Organizations in which most workers felt that they:

- frequently lacked the ability to complete the more difficult tasks successfully, and
- were dissatisfied with their job level,

and

- were relatively satisfied with other aspects of the job

were generally characterized as groups which:

- maintained a high quantity of output, and
- were relatively efficient, but
- were somewhat slow in adjusting to new methods.

3. Organizations in which most workers felt that:

- their jobs did not require them to perform at their highest level of capability, and
- management frequently made errors of judgment, and
- the work was not particularly interesting or important

were generally characterized as groups which:

- were relatively inefficient, but still
- maintained a high quantity of output, and
- possessed a high degree of flexibility to cope with unforeseen situations.

4. Organizations in which most workers felt that:

- their individual effort directly related to the unit's total output, but that

- their jobs did not require them to perform at their highest level of capability, and

- management frequently made errors of judgment, and

- their job level was too low

were generally characterized as groups which:

- produced a high quality output, but which

- were relatively poor in anticipating problems in advance and in developing satisfactory and timely solutions to them.

5. Organizations in which most workers felt:

- they were well suited to their jobs, but

that

- the general decision making structure within the organization was not satisfactory

were generally characterized as groups which had:

- a high proportion of individuals who would readily adjust to new procedures but had
- difficulty staying abreast of new technologies and methods applicable to the work activities, and had
- difficulty in anticipating problems and developing timely solutions to them.

It must be stated once again that the relationships are between the sets of variables and not between the individual variables themselves. Because of the interdependency that exists between variables of the type used in this study, the effect one variable might have on the overall environment could vary considerably depending upon what other conditions were also present at that time. To state, for example, that relationship one indicates that high quality supervision is present in the more efficient organizations would be an incorrect interpretation of the canonical output. While that statement may or may not, in fact, be true, it is not what is being suggested in this analysis. The correct inference is that when quality supervision is combined with high group cohesiveness high efficiency, awareness, and anticipation also seem to be present. The implication is that when dealing with complex variables associated with human feelings and behavior

concentrating on only one variable at a time can lead to erroneous and inconsistent results. It is not only the variables but also the interaction between them that are important.

Conclusions

This study has shown that relationships do exist between specific dimensions of worker attitudes and specific criteria of organizational effectiveness, and that it is possible to identify them through multivariate analysis. While the more general type variables which are frequently used are more easy to deal with, the results are much less specific, and replicative studies that follow often show inconsistent conclusions. One answer to this problem seems to be to use the more specific approach when dealing with such complex areas as attitudes and performance.

It has also been shown that the effectiveness of organizations can be adequately measured by using the perceptions of individuals within the groups about how well their unit performs. For application in the organizational behavior area at least, the more comprehensive "soft" measures of the type used in this study are less costly and seem somewhat more appropriate than the "hard" productivity measures which are frequently used.

While these two findings themselves have made this research worthwhile, the relationships which were found were relatively specific; therefore, it seems necessary to develop more definitive conclusions from them. A major obstacle appears, however, when one considers the limitations of the study which were expressed in Part I. Primarily, the results cannot be considered normative, and specific implications for management action cannot be precisely stated.

The population from which the sample data were obtained was limited to civil-service workers at Warner Robins Air Logistics Center. Any findings must, therefore, be restricted to that group. Additional studies using different populations must be made before any generally applicable conclusions can be accepted.

Since the research design did not include any method for establishing cause and effect relationships between the correlations which were found, it would not be proper to conclude that they did, in fact, exist. This requires any specific conclusions regarding the relationships to be stated as "theoretical" implications or as postulates for management consideration.

The results of this study do indicate, however, that specific effectiveness areas are related to specific worker attitudes. These relationships are interpreted

below in terms of postulates which can at least be used as guidelines for management as well as specific areas requiring further research. As additional studies are made, if there is substantial support for one or more of these postulates, they can then be stated in terms of actions management might take to achieve a particular effectiveness objective. For the present, however, they must remain as theoretical implications. The following postulates are an interpretation of Table 3-7.

Postulate 1: + Quantity + Efficiency - Promptness

The combination of high quantity and high efficiency with a low promptness of acceptance seems to be associated with:

- Increasing general job satisfaction except for satisfaction with job level

- Providing the worker with incentives to work himself up the hierarchical job ladder--in other words, making him want to be promoted

- Not allowing the worker to feel he has mastered his job--he should always believe that he can improve his individual ability

Postulate 2: + Quantity + Flexibility - Efficiency

The combination of high quantity and high flexibility with low efficiency seems to be associated with:

-Making the worker feel that his present job does not call for him to perform at his full capability--making him dissatisfied with the difference between his abilities and those demanded in the job

-Not allowing the worker to become overly committed to his job--high job commitment reduces output by causing the worker to be concerned with other aspects of the job, thereby slowing down production

-Unrealistic production schedules and organizational goals--although the worker will lack confidence in managerial judgment, he will still try to meet the goals by producing more

Postulate 3: + Quality - Anticipation

The combination of high quality with low problem anticipation seems to be associated with:

-Establishing reasonable production schedules and organizational goals--the worker must have time to produce quality work

-Making the worker feel that his individual effort has a direct impact on the final output product

-Making the worker dissatisfied with his job level by providing incentives to make him want to be promoted

-Making the worker feel that his job is not demanding his full capabilities

Postulate 4: + Efficiency + Anticipation + Awareness

The combination of high efficiency, high anticipation, and high awareness of new methods seems to be associated with:

- Developing and maintaining high quality supervision

- Developing high group cohesiveness

Postulate 5: + Efficiency - Quantity - Flexibility

The combination of high efficiency, with low quantity, and low flexibility seems to be associated with:

- Making the worker feel he is performing at his maximum capability

- High individual job commitment

- Establishing realistic production schedules and organizational goals

Postulate 6: + Anticipation - Quality

The combination of high anticipation of problems with low output quality seems to be associated with:

- Establishing unrealistic production schedules and organizational goals

- Making the worker feel his individual effort does not affect the final output

- Keeping the worker satisfied with his current job level

-Making the worker feel he is performing at his maximum capability

Postulate 7: + Anticipation + Awareness - Prevalence

The combination of high anticipation and high awareness with a low prevalence of adjustment seems to be associated with:

-Improving the flow of information within the organization and delegating decision-making authority to the proper level

-Making the worker feel dissatisfied with the difference between his abilities and those demanded in the job

Postulate 8: + Promptness - Quantity - Efficiency

The combination of high promptness of adjustment with both low quantity and low efficiency seems to be associated with:

-Making the worker generally dissatisfied with his job except for job level

-Keeping the worker satisfied with his current job level

-Making the worker feel he has mastered all aspects of his job

Postulate 9: + Prevalence - Anticipation - Awareness

The combination of a high prevalence of adjustment with low anticipation of problems and a low awareness of

new methods seems to be associated with:

-A restricted flow of information within the organization and poor delegation of decision-making authority

-Making the worker feel satisfied with the fit between his abilities and those demanded in the job--he will then feel comfortable in his job and will more readily accept new procedures

Hopefully, the findings of this research effort will provide both impetus and direction for more specific, additional research in this area. More definitive statements pertaining to organizational behavior and management practice can be developed once one has identified the more specific relationships which exist between man, his motivations, his work, and his environment.

Recommendations for Further Research

An exploratory research of this type frequently asks more questions than it answers. Not only must this study be replicated in a different environment to see if the same relationships appear under different circumstances, but also, each of the relationships that were found should be researched further in order to more completely explain, support, or question the results which were obtained. Further, different attitudes and measures of effectiveness

should be examined to see if additional relationships can be identified.

Use of the computer to apply and develop more complex multivariate techniques in the behavioral aspects of management is still in its infant stage. Much further research remains before more comprehensive, predictive behavioral management theories can be developed. Several specific research areas were suggested by this study.

The strongest relationship in the analysis indicated that high quality of supervision and high group cohesiveness had very little association with the quantity or quality of output or with the organization's ability to quickly cope with emergencies. While logical arguments can be made in support of this finding, it is not one which enjoys a great deal of support in current management thought. Further research is certainly called for to shed additional light on this subject. Most managers assume that good quality supervision is one of the more important factors leading to both high production quantity and quality. The findings of this research suggest that this might not be the case.

Another recommended subject for further research lies in the area of job satisfaction. Both the quantity and quality of output were inversely related to the

worker's satisfaction with his job level and his job fit. Satisfaction with job level was also inversely related to efficiency. It would seem that high total performance is accompanied with job satisfaction in some areas and with dissatisfaction in others. One could, therefore, either support or reject the premise that satisfied workers were high producers depending on what specific job satisfactions were being measured.

Of the twenty-four dimensions of the attitudinal data that were found only ten had a relatively large relationship with one or more of the effectiveness measures. Additional measures of effectiveness should, therefore, be incorporated in follow-on research of this type to search for relationships that were not identified in this study.

Along the same lines, there are many attitudes that workers possess which were not measured in this study. These include attitudes pertaining to job security, pay, and worker benefits, among others. While these attitudes are, admittedly, important, an attempt to measure all possible attitudes would have made the questionnaire too large to be used effectively. Since the selected sample consisted entirely of civil-service workers, who have much of their job security, pay, and benefits established

by federal actions, it was decided to omit these areas in this study. Different sets of attitude questions should still be used in other studies, however, to obtain additional attitude dimensions which could also have strong relationships to specific effectiveness variables.

It has been shown that attitudes are related to performance. The problem of not finding a relationship in many prior studies was most likely due to the use of either very global or general measures which clouded the relationships or from the use of techniques which did not consider the interrelatedness of the data, thereby allowing the relationships to be minimized by counterbalancing factors. The best opportunity for finding more specific relationships between attitudes and effectiveness is to use more specific variables and to subject them to appropriate multivariate analyses. Hopefully, continued and rigorous research in the attitude-effectiveness area will point the way toward making organizations more effective while still improving the quality of working life experienced by the organization members.

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APPENDIX A
QUESTIONS PERTAINING TO EFFECTIVENESS

DIRECTIONS

The Directorate of Maintenance considers your opinion to be important. This questionnaire is being administered to assist in the evaluation of behavioral science techniques in your Resource Control Center. The results of the questionnaire will be of great help in determining if what we do really changes anything.

Please do not put your name on this questionnaire booklet. Your answers to these questions will be kept confidential, and no attempt will be made to identify any individual by name. Your frank, honest answers to each question are desired and needed. We would like you to answer all of the questions in this booklet. If you feel, however, that any item requests information that you consider personal, you may skip that question.

Please read each question carefully, then read each of the answers given. Choose one statement that best describes your feeling or opinion. Then, make a mark on the answer sheet between dotted lines below the letter corresponding to that answer. Always make sure that the number on the answer sheet is the same as the number on the question. If you wish to change an answer, be sure to erase the first mark completely. You will have as much time as necessary to complete the questionnaire.

DO NOT WRITE IN THIS BOOKLET

1. Thinking of the various items or services produced by the people you know in your RCC, how much are they producing?
 - (A) Their production is very high
 - (B) It is fairly high
 - (C) It is neither high nor low
 - (D) It is fairly low
 - (E) It is very low
2. How good would you say is the quality of the products or services produced by the people you know in your RCC?
 - (A) Their products or services are of excellent quality
 - (B) Good quality
 - (C) Fair quality
 - (D) Their quality is not too good
 - (E) Their quality is poor
3. Do the people in your RCC seem to get maximum output from the resources (money, people, equipment, etc.) they have available? That is, how efficiently do they do their work?
 - (A) They do not work efficiently at all
 - (B) Not too efficient
 - (C) Fairly efficient
 - (D) They are very efficient
 - (E) They are extremely efficient
4. How good a job is done by the people in your RCC in anticipating problems that may come up in the future and preventing them from occurring or minimizing their effects?
 - (A) They do an excellent job in anticipating problems
 - (B) They do a very good job
 - (C) A fair job
 - (D) Not too good a job
 - (E) They do a poor job in anticipating problems
5. From time to time newer ways are discovered to organize work, and newer equipment and techniques are found with which to do the work. How good a job do the people in your RCC do at keeping up with these changes that could affect their work?
 - (A) They do a poor job of keeping up to date
 - (B) Not too good a job
 - (C) A fair job
 - (D) They do a good job
 - (E) They do an excellent job of keeping up to date

6. When changes are made in the routines or equipment, how quickly do the people in your RCC accept and adapt to these changes?
- (A) Most people accept and adjust to them immediately
 - (B) They adjust very rapidly, but not immediately
 - (C) Fairly rapidly
 - (D) Rather slowly
 - (E) Most people accept and adjust to them very slowly
7. What proportion of the people in your RCC readily accept and adjust to these changes?
- (A) Considerably less than half of the people accept and adjust to these changes readily
 - (B) Slightly less than half do
 - (C) The majority do
 - (D) Considerably more than half do
 - (E) Practically everyone accepts and adjusts to changes readily
8. From time to time emergencies arise, such as crash programs, schedules moved ahead, or a breakdown in the flow of work occurs. When these emergencies occur, they cause work overloads for many people. Some work groups cope with these emergencies more readily and successfully than others. How good a job do the people in your RCC do in coping with these situations?
- (A) They do a poor job in handling emergency situations
 - (B) They do not do very well
 - (C) They do a fair job
 - (D) They do a good job
 - (E) They do an excellent job of handling these situations

APPENDIX B
QUESTIONS PERTAINING TO ATTITUDES

1. My supervisor takes time to listen to job problems.
 - (A) Always
 - (B) Usually
 - (C) Sometimes
 - (D) Infrequently
 - (E) Never
2. Your immediate supervisor uses your ideas on how to improve your job.
 - (A) Always
 - (B) Usually
 - (C) Sometimes
 - (D) Infrequently
 - (E) Never
3. Does your immediate supervisor use your suggestions in job related problem solving?
 - (A) Always
 - (B) Usually
 - (C) Sometimes
 - (D) Infrequently
 - (E) Never
4. Does your immediate supervisor tell you how your job contributes to meeting shop production goals?
 - (A) Very Much
 - (B) Much
 - (C) Undecided
 - (D) Little
 - (E) Very Little
5. Does your immediate supervisor tell you what's going on at higher levels of management?
 - (A) Very Much
 - (B) Much
 - (C) Undecided
 - (D) Little
 - (E) Very Little
6. My supervisor shows interest in me as an individual.
 - (A) Definitely Yes
 - (B) Mostly Yes
 - (C) Sometimes
 - (D) Mostly No
 - (E) Definitely No
7. My supervisor gives me responsibility in line with my abilities.
 - (A) Definitely Yes
 - (B) Mostly Yes
 - (C) Sometimes
 - (D) Mostly No
 - (E) Definitely No

8. I am satisfied with the feedback I receive in doing my job.
- (A) Definitely Yes
 - (B) Mostly Yes
 - (C) Sometimes
 - (D) Mostly No
 - (E) Definitely No
9. I am allowed to see the results of my work.
- (A) Always
 - (B) Usually
 - (C) Sometimes
 - (D) Infrequently
 - (E) Never
10. I am helped in correcting errors I make.
- (A) Always
 - (B) Usually
 - (C) Sometimes
 - (D) Infrequently
 - (E) Never
11. I help set my own quality goals.
- (A) Always
 - (B) Usually
 - (C) Sometimes
 - (D) Infrequently
 - (E) Never
12. I understand how the quality of my work is measured.
- (A) Always
 - (B) Usually
 - (C) Sometimes
 - (D) Infrequently
 - (E) Never
13. I know the quality standards required for my work.
- (A) Always
 - (B) Usually
 - (C) Sometimes
 - (D) Infrequently
 - (E) Never
14. My supervisor knows when I do a good job.
- (A) Strongly Agree
 - (B) Agree
 - (C) Undecided
 - (D) Disagree
 - (E) Strongly Disagree

15. My job is over supervised.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
16. Does your immediate supervisor have confidence in your ability to perform your job?
(A) Very Much
(B) Much
(C) Undecided
(D) Little
(E) Very Little
17. Identified job problems are quickly resolved by management.
(A) Always
(B) Usually
(C) Sometimes
(D) Infrequently
(E) Never
18. I am kept informed of why some problems are not resolved quickly.
(A) Always
(B) Usually
(C) Sometimes
(D) Infrequently
(E) Never
19. Your supervisor spends too much time away from his work area.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
20. Your supervisor is well qualified for his job.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
21. My supervisor tries to strike a balance between people needs and production needs.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No

22. My supervisor is a capable individual.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
23. My supervisor understands human relations.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
24. Do you feel that pressure is used to obtain increased production?
(A) Very Much
(B) Much
(C) Undecided
(D) Little
(E) Very Little
25. Do you feel that decisions which affect your job are based on technical or engineering analyses?
(A) Very Much
(B) Much
(C) Undecided
(D) Little
(E) Very Little
26. Do you feel secure in your job?
(A) Very Much
(B) Much
(C) Undecided
(D) Little
(E) Very Little
27. How much satisfaction do you gain from the performance of your job?
(A) Very Much
(B) Much
(C) Undecided
(D) Little
(E) Very Little

28. Think about the specific duties of your job. How often have you felt unable to use your full capabilities in the performance of your job?
- (A) Always
 - (B) Usually
 - (C) Sometimes
 - (D) Infrequently
 - (E) Never
29. In thinking about your job--do you have a sense or feeling of achievement?
- (A) Always
 - (B) Usually
 - (C) Sometimes
 - (D) Infrequently
 - (E) Never
30. You get recognition when you deserve it.
- (A) Always
 - (B) Usually
 - (C) Sometimes
 - (D) Infrequently
 - (E) Never
31. Your present job assignment offers the opportunity for future advancement.
- (A) Strongly Agree
 - (B) Agree
 - (C) Undecided
 - (D) Disagree
 - (E) Strongly Disagree
32. Your work assignment is challenging.
- (A) Almost All of the Time
 - (B) Very Often
 - (C) Half the Time
 - (D) Seldom
 - (E) Almost Never
33. Do you have ample workload to maintain your desired production rate?
- (A) Almost All of the Time
 - (B) Very Often
 - (C) Half the Time
 - (D) Seldom
 - (E) Almost Never
34. Do you feel you need more freedom in your job assignment to get the work done?
- (A) Almost All of the Time
 - (B) Very Often
 - (C) Half the Time
 - (D) Seldom
 - (E) Almost Never

35. The production schedules in your work areas are realistic.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
36. My job description does reflect the assignments I am given.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
37. How often would you encourage others to seek a job like yours?
(A) Almost Always
(B) Very Often
(C) Sometimes
(D) Very Seldom
(E) Almost Never
38. If given the opportunity would you cross train to a different job at the same pay rate?
(A) Yes
(B) Probably
(C) Would Consider
(D) Probably Not
(E) No
39. Would you follow your job to another location in the continental United States?
(A) Yes
(B) Probably
(C) Would Consider
(D) Probably Not
(E) No
40. How many parts of your job would you change if allowed to do so?
(A) None
(B) Very Few
(C) Half of Them
(D) Most of Them
(E) Almost All of Them

41. Do you see constraints to good production in your job?
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
42. I help to set the goals of my work unit.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
43. I dread going to work.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
44. Everything considered, my job is very satisfactory.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
45. My grade level is too low for the work I do.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
46. My skills and abilities are being used to the fullest at my present job.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
47. I receive the necessary amount of training to do my job well.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No

48. I have the chance to continually learn something worthwhile.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
49. I have necessary authority to carry out my job.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
50. I have all the responsibility I want.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
51. I feel responsible for my own efforts at work.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
52. I feel a sense of responsibility on my job.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
53. I enjoy a feeling of responsibility on my job.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
54. I am allowed to use my own judgment on the job.
(A) Always
(B) Usually
(C) Sometimes
(D) Infrequently
(E) Never

55. Time passes quickly for me on the job.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
56. My job instructions are clear and easy to follow.
(A) Always
(B) Usually
(C) Sometimes
(D) Infrequently
(E) Never
57. The procedures I am asked to follow in doing my job are sensible.
(A) Always
(B) Usually
(C) Sometimes
(D) Infrequently
(E) Never
58. I can obtain tools when they are needed.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
59. Our equipment is maintained well.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
60. Equipment needed to accomplish the job is available.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
61. I can obtain the parts needed to do my job.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree

62. I am determined to meet my job commitments.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
63. I understand how my production output is measured.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
64. I understand how the quality of my work is measured.
(A) Always
(B) Usually
(C) Sometimes
(D) Infrequently
(E) Never
65. Do you understand how the output of your organizational unit is measured?
(A) Almost All of the Time
(B) Very Often
(C) Half the Time
(D) Seldom
(E) Almost Never
66. I am involved in establishing my production goals.
(A) Always
(B) Usually
(C) Sometimes
(D) Infrequently
(E) Never
67. The quality standards for my work are reasonable.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
68. I know how much work I am expected to do.
(A) Always
(B) Usually
(C) Sometimes
(D) Infrequently
(E) Never

69. I would describe my job as
(A) Interesting
(B) Demanding my best abilities and skills
(C) Allowing me to contribute innovative ideas
(D) Satisfactory
(E) Dull, Uninteresting
70. Do you know how to reduce the cost of the units you produce?
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
71. Material waste can be reduced in your work area?
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
72. If I had more work I would not take as much short term leave.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
73. Would additional technical training improve your chances for promotion?
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
74. What part of your job could be performed by a person having less skill than you?
(A) 20%
(B) 35%
(C) 50%
(D) 70%
(E) 100%
75. The method I use to inspect and assemble the end item can be improved.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No

76. The people in my RCC work together effectively as a team.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
77. Do you feel your fellow workers are supporting the production effort in your shop?
(A) Very much
(B) Much
(C) Undecided
(D) Little
(E) Very Little
78. Do you feel your fellow workers are working at their full capacity?
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
79. How often do you feel your fellow workers abuse their sick leave?
(A) Always
(B) Usually
(C) Sometimes
(D) Infrequently
(E) Never
80. Employees in your area have difficulty in relating their work effort to physical output and/or services.
(A) Strongly Agree
(B) Agree
(C) Undecided
(D) Disagree
(E) Strongly Disagree
81. I feel that time clocks are necessary for the people in my RCC.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
82. Work responsibilities within my RCC are clearly defined.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No

83. Communication within my RCC is good.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
84. Communication between my RCC and the Division are good.
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
85. Do you feel you are working at your full capacity?
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
86. How often do you successfully complete difficult jobs?
(A) Always
(B) Usually
(C) Sometimes
(D) Infrequently
(E) Never
87. Do you feel that upper levels of management understand the problems you face in doing your job?
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
88. Do you feel your immediate supervisor knows and understands the problems you have in doing your jobs?
(A) Definitely Yes
(B) Mostly Yes
(C) Sometimes
(D) Mostly No
(E) Definitely No
89. How often do you feel that the right decisions are made at upper levels of supervision?
(A) Always
(B) Usually
(C) Sometimes
(D) Infrequently
(E) Never

90. How often do you feel that the right decisions are made at intermediate levels of supervision?
- (A) Always
 - (B) Usually
 - (C) Sometimes
 - (D) Infrequently
 - (E) Never
91. How often do you feel that the right decisions are made at lower levels of management?
- (A) Always
 - (B) Usually
 - (C) Sometimes
 - (D) Infrequently
 - (E) Never
92. Do you feel that decision-makers at the Director level are aware of lower level problems?
- (A) Definitely Yes
 - (B) Mostly Yes
 - (C) Sometimes
 - (D) Mostly No
 - (E) Definitely No
93. Do you feel decisions are made at the proper level of supervision?
- (A) Definitely Yes
 - (B) Mostly Yes
 - (C) Sometimes
 - (D) Mostly No
 - (E) Definitely No
94. Meaningful organizational goals have been established for work.
- (A) Strongly Agree
 - (B) Agree
 - (C) Undecided
 - (D) Disagree
 - (E) Strongly Disagree

APPENDIX C
FACTOR MATRIX AFTER VARIMAX ROTATION

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6	FACTOR 7	FACTOR 8	FACTOR 9	FACTOR 10
VAR1	.55443	.18247	.16350	.04550	.12341	.01061	.01403	.07125	-.03902	-.02576
VAR2	.30017	.10004	.04450	.00845	.09607	.07021	-.02311	.01961	.03494	-.07075
VAR3	.42774	.13514	.02220	.03631	.01020	.18552	.05461	-.00365	.02028	-.00533
VAR4	.57274	.10747	.12142	.11534	.19560	.18552	.05461	.00171	-.07571	.09313
VAR5	.60437	.10005	.10006	.02770	.04037	.17073	-.03115	.01037	.04076	.17353
VAR6	.69307	.18129	.15729	.19764	.13074	.05402	.10974	.04616	.00547	-.00629
VAR7	.42217	.04406	.04309	-.01653	.17236	.12513	-.06315	.06639	-.03170	.22044
VAR8	.52216	.31708	.15215	.12722	.10764	.11704	-.05637	.04397	.01095	.04442
VAR9	.36434	.15096	.00602	.17047	.00244	.22628	-.01048	.09410	.00797	.21246
VAR10	.47068	.12746	.15550	.20047	-.00703	.00440	.17271	.11157	-.02421	.10215
VAR11	.06029	.02125	.04035	.00770	.07437	.15948	-.01344	.01623	.03113	-.04313
VAR12	.21746	.09116	.09238	.04203	.04444	.70420	.07654	.01287	-.06237	.03633
VAR13	.14704	-.06293	.10803	.01673	.14598	.56847	.05469	.02531	-.11702	.12738
VAR14	.64094	.06171	.10014	-.02866	.20873	.15505	.04804	.01990	-.05104	.02016
VAR15	.08224	.11201	.00593	-.03694	.12931	.03673	.72755	.00049	.03847	-.06370
VAR16	.44676	.01300	.04656	.01457	.20707	.20642	-.04946	.06743	.09776	-.02101
VAR17	.61233	.47896	.15597	.24624	.05336	.12665	.12221	.24715	.08234	.02131
VAR18	.44152	.31522	.11000	.20958	.05856	.19091	-.03059	.22508	.03620	.14645
VAR19	.36711	.14064	-.01042	-.03285	-.02909	.01130	.04601	.07058	.01277	.03589
VAR20	.71825	.10049	.15261	.14175	.04123	.05230	-.04636	.09309	-.02547	-.00556
VAR21	.70668	-.01055	.13304	.03637	.11050	.06138	-.19928	.01257	-.02219	-.05561
VAR22	.72606	.14162	.10000	.16606	.02636	.10678	.07309	-.00247	-.05419	.10721
VAR23	.74527	.19185	.11331	.11656	.08154	.13029	.07268	.01628	-.05461	-.08382
VAR24	.26354	-.24387	.14594	-.09240	.07846	.07742	.49797	.12035	.09910	.05397
VAR25	.10424	.18511	.20009	.03633	.18442	.03121	.02273	.54262	-.09406	.03414
VAR26	.09995	.24000	.27551	.19703	.09733	.12516	.11148	.08579	.09387	.04471
VAR27	.25157	.69772	.59024	.01176	.24214	.16725	-.02814	.02814	.01383	.01113
VAR28	.03446	.06073	.14680	.01554	-.03392	.00118	.09560	.07718	.07250	.16683
VAR29	.21850	.00761	.49723	-.06683	.04953	.00118	.06102	.01449	.00795	.04094
VAR30	.51062	.29463	.18024	.17468	.13339	.21930	.13334	.04274	.10038	.07179
VAR31	.24160	.30199	.28921	.06699	.01751	.14648	.00023	.06175	-.07614	.28877
VAR32	.13075	.13115	.69343	.05240	.05965	.20285	-.08064	.17826	-.02999	.00824
VAR33	.08070	.05335	.29241	.03846	.10790	.19942	.19514	.11777	.33759	.30467
VAR34	.15906	.12350	-.05009	-.03110	.04025	.14304	.58862	.04943	.03227	.07328
VAR35	.24804	.08295	.66927	.16181	.14195	.11634	.08732	.59337	.01914	.03399
VAR36	.09045	.21943	.24713	.07549	.01956	.14849	.01717	.05472	.18630	-.01376
VAR37	.25104	.27811	.57331	.06973	.00902	.07634	.03562	.07046	.12107	.00462
VAR38	.10527	.01160	-.26597	.02144	.05756	.11700	-.00951	.37941	.16742	.06420
VAR39	.04471	.07645	.05736	-.06514	.00955	.02772	.01925	.03678	.09167	.12620
VAR40	.30463	.11553	.52806	.20584	.07552	.05701	.12566	.04445	-.09358	.10599
VAR41	.00113	.14068	.00256	.00260	.10659	.03921	.10917	.08155	.03062	.01285
VAR42	.06340	.09832	.07003	.00939	.06507	.10385	-.03334	.15204	-.00414	-.00868
VAR43	-.21564	-.11511	-.54403	.18542	.12001	.12480	.17708	.02354	-.06153	.00044
VAR44	.39809	.15425	.51335	.11354	.09104	.06381	.00138	.08664	-.03073	-.01301

	FACTOR 11	FACTOR 12	FACTOR 13	FACTOR 14	FACTOR 15	FACTOR 16	FACTOR 17	FACTOR 18	FACTOR 19	FACTOR 20
VAR1	.06405	.01600	.06964	-.02495	-.03032	-.03237	-.05539	.01248	-.11665	.70690
VAR2	.02537	.07658	.11719	.00186	.10241	.10243	-.03345	.01467	-.08157	.03997
VAR3	.01614	.03166	.08187	.07488	.11361	.12181	.03519	-.01866	.03987	.03408
VAR4	.02626	-.10471	-.01165	-.02734	.08480	.07698	-.03399	-.05644	.09184	-.01991
VAR5	.23414	.00402	-.01694	.03992	.13117	.00070	.11529	.01244	.17105	-.02169
VAR6	.05512	-.04402	.03677	.01656	.02435	-.02023	.11479	.05511	.10293	.10293
VAR7	.21007	.02010	.10179	.08845	-.12104	-.02336	.11883	.15703	.18905	-.04768
VAR8	.15626	.06450	.10165	.01235	-.06942	-.06738	.06719	-.07928	.10201	.16512
VAR9	.09413	.02146	.42282	.01295	-.06677	.06440	.02227	-.06473	.05522	-.08044
VAR10	-.00401	-.00945	-.01245	-.01243	.02456	.06632	-.07197	.11201	-.06784	.05187
VAR11	-.07056	-.14590	.67401	.16024	-.04154	.16980	.01999	.06716	.03649	.10621
VAR12	.07734	.02234	.33299	.06026	.02286	.05118	.05501	.06308	.06650	.06263
VAR13	.06053	-.02480	.25425	.01498	.02004	.00067	.26004	.11356	.13044	.00263
VAR14	.16671	-.04540	.05674	.09255	-.04243	-.00667	.12241	.02787	.02922	.04991
VAR15	-.01392	-.02242	.05532	-.04194	.01556	.12876	.06841	.01108	.02803	-.15152
VAR16	.26599	-.04232	.29375	.24602	-.14409	.10169	.09993	.00069	.07241	.17581
VAR17	.07582	-.04931	.09662	.01784	.01222	.11774	.10359	.12196	.03346	.04822
VAR18	-.04885	-.06707	.12063	-.07673	-.12465	.03552	.02021	.13274	.11705	.09450
VAR19	-.00102	-.00218	-.06804	.06016	.01936	-.05329	.00025	.06773	.03802	-.69424
VAR20	.10792	.09500	-.00186	-.02632	.13118	.00016	-.06164	.02005	.03092	.29238
VAR21	-.12562	-.01135	.01750	-.05560	.12153	.03990	.12876	.13335	.11879	-.05521
VAR22	.06392	.12447	.02591	-.02058	.09644	.05405	.02291	.06904	.05655	.29122
VAR23	.03345	.00842	.00165	-.02058	.09644	.05405	.02291	.06904	.05655	.29122
VAR24	.00845	-.05027	.00604	.18036	.09323	-.06984	.09153	.23727	.00322	.10585
VAR25	-.06723	.06151	.07042	-.04301	.01809	.10717	-.07678	.16893	.10290	-.12573
VAR26	.30145	.23115	.29153	-.18905	.26587	.05233	.04748	.00827	.07037	.09832
VAR27	.23546	-.02031	.18468	.09183	.00832	.03256	.11231	.00142	.83426	.08418
VAR28	-.06610	.01473	.05719	-.11864	.00379	-.05574	.09876	.72555	.13138	.06434
VAR29	.06417	-.08513	.16107	.02110	.20921	.06173	.01609	.16235	.09930	.06431
VAR30	-.03745	.15541	.02873	-.12985	.03179	.03179	.06253	.02333	.12384	.13689
VAR31	.16347	-.08730	-.08679	.17579	.29327	-.20468	.06542	-.02333	.19084	-.01115
VAR32	-.06734	-.08659	-.13095	.01696	.01059	.03175	.03011	.06485	.04402	.02511
VAR33	.08242	.14671	.06136	-.03364	.01717	.16076	.06706	-.08202	.31371	.04426
VAR34	.06109	-.19651	.18303	-.04205	.09032	.03312	.01932	.14239	.19868	.16716
VAR35	.14584	.02558	-.02395	.06013	.09754	.09249	.06751	.09354	.05073	.08879
VAR36	.59241	.02577	-.04185	-.18042	.03240	-.01419	.08340	-.09378	.04666	.02992
VAR37	.10052	.24996	.00001	-.06005	.03761	.02036	-.04667	.01647	.02303	.01849
VAR38	.21674	-.23522	-.14261	.05548	.18533	.10432	.09084	.18786	.02303	.01849
VAR39	-.00367	.11377	.06057	.04815	.15141	.04186	.13983	.18786	.02303	.01849
VAR40	.05142	.21754	-.00245	.00203	.04427	.13590	-.06423	.00443	.07050	.06134
VAR41	.03604	-.04411	.04010	-.00119	.00069	.13797	.02464	.11092	.07050	.06134
VAR42	-.02691	.02101	.19545	-.03259	.00358	.71701	.02022	.02150	.72106	.04200
VAR43	-.09194	.02034	.16785	-.02160	-.02523	.04390	.07755	.22147	.29101	.09362
VAR44	.03694	.10319	.12006	.03027	-.08440	.17446	-.07146	.25066	.19316	.05767
VAR45	-.06275	-.78461	.16112	.00344	.09942	.01941	-.03434	.00890	.02105	.05563
VAR46	.20115	.15101	-.13405	.08184	.07847	.21552	-.09305	.06976	.02105	.05563
VAR47	.10310	.05412	.17431	-.19444	.22590	.12007	.20041	-.00890	.25078	.03366
VAR48	-.07225	-.05394	.00673	-.19444	.22590	.12007	.20041	-.00890	.25078	.03366
VAR49	.21752	.04275	-.04091	-.09755	-.16024	.07247	-.21325	.01310	-.02122	.00803
VAR50	.12673	.21262	-.07696	.00531	-.09456	.23031	.01406	-.05874	.03669	.10914
						.34290	-.08330	-.00421	.03483	-.13380

	FACTOR 21	FACTOR 22	FACTOR 23	FACTOR 2
VAR1	.31176	-.00491	.00419	.00400
VAR2	.74896	.04119	-.04021	.04608
VAR3	.68058	.00232	-.00713	.05185
VAR4	.27475	.11590	.08508	-.06822
VAR5	.16217	-.03267	.14701	-.17011
VAR6	.10355	.07011	.04260	-.04721
VAR7	.40699	.13784	.06519	.01513
VAR8	.22799	.08410	.02839	.01710
VAR9	.26760	.05585	.18383	-.05651
VAR10	.13055	-.02344	.06556	.31702
VAR11	.13821	.01190	.05874	.04336
VAR12	.03656	.02168	-.04703	-.01223
VAR13	-.17295	-.11541	.05529	.09286
VAR14	-.06641	.11079	.06827	-.09512
VAR15	.03127	-.07678	-.05425	.01027
VAR16	.09520	.05931	.07168	-.13794
VAR17	.12755	-.03066	.01987	.10607
VAR18	.17149	-.03537	-.06934	-.00257
VAR19	-.03738	.13784	-.09468	.02168
VAR20	-.01324	.08303	-.06344	.04557
VAR21	.07512	.16120	-.00760	.04814
VAR22	-.04724	.07181	-.03744	.01192
VAR23	-.00940	.06686	.10050	-.06077
VAR24	-.07449	-.15332	-.13912	-.25100
VAR25	-.00410	.11911	.02778	-.01931
VAR26	.06996	-.04093	-.17950	.15244
VAR27	.00147	.00961	-.17078	-.11103
VAR28	.00453	-.02539	.06183	-.02424
VAR29	.16404	.19042	-.15009	-.06570
VAR30	.19138	.06211	.04003	-.10462
VAR31	.03256	.1158	.22476	-.02675
VAR32	.15342	.07750	.00712	-.02421
VAR33	-.03061	.16964	-.10380	-.08954
VAR34	-.02428	.02500	.10839	.07053
VAR35	.06574	-.04525	-.05640	-.04776
VAR36	.10064	.09261	.00963	.04694
VAR37	-.02352	.01426	.23373	-.01253
VAR38	-.07471	-.01588	-.08070	.10764
VAR39	-.01490	-.08407	.75297	-.00542
VAR40	.05150	.20926	.15464	.03008
VAR41	-.00474	-.00662	-.01922	.07233
VAR42	.09610	-.01325	.06509	-.07441
VAR43	.08084	-.13644	-.15810	.07621
VAR44	-.05356	.18218	.08114	-.09010
VAR45	-.06624	-.05449	-.14767	-.02438
VAR46	.08128	.17151	.03292	.01727
VAR47	-.03643	.15386	-.02191	.02462
VAR48	-.02132	.13661	.14863	.06610
VAR49	.23732	.06562	-.03783	-.22996
VAR50	-.13991	-.05940	-.10264	.09024

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6	FACTOR 7	FACTOR 8	FACTOR 9	FACTOR 10
VAP45	.00216	-.11143	-.02495	-.04414	-.01109	-.08514	.10170	-.13523	.07409	-.10200
VAP46	.16999	.06994	.62531	.10624	-.04110	.08960	.06792	.06956	-.31291	.07097
VAP47	.10610	.21279	.21301	.27717	.15340	.02070	.06792	.10004	.04024	.21416
VAP48	.21528	.20073	.15793	.07724	.11422	.16006	.09019	.11211	.09019	.31741
VAP49	.10065	.10065	.13948	.10724	.27055	.13202	-.15154	.20984	-.11515	.31741
VAP50	.22045	.10690	.17650	.10100	.02066	.01007	.00092	.00092	.31670	.30033
VAP51	.21146	.13404	.10437	-.02082	.60730	.12074	-.12000	.04316	.04799	.00555
VAP52	.18146	.11031	.09081	.04928	.81458	.08356	.00074	.14964	-.0184	.00076
VAP53	.12366	.10006	.13724	.08758	.81232	.08334	-.01608	.14964	.01881	.00076
VAP54	.16104	-.10180	.06176	.21712	.49546	.19420	-.07249	.06204	.10004	.00076
VAP55	.16459	.12293	.36097	.21254	.50120	.02355	.00049	.02076	.10461	.00076
VAP56	.14319	.14036	.09675	.28992	.18123	.19759	.08907	.02076	.07507	.00076
VAP57	.15085	.15085	.23475	.34034	.19820	.09426	.00049	.02076	.11981	.02145
VAP58	.07630	.15411	.04130	.71768	.12770	.12113	.00410	.10695	.20049	.17724
VAP59	.24424	.17513	.14861	.70860	.12770	.08250	.00410	.10695	.20049	.17724
VAP60	.15816	.20440	.11783	.79264	.05950	.06301	.00410	.10695	.20049	.17724
VAP61	.21979	.25088	-.04343	.65527	.05950	.06301	.00410	.10695	.20049	.17724
VAP62	.01073	.06794	.04897	.33633	.37384	.20129	.00942	.07901	.07668	.00530
VAP63	.20925	.17768	.00621	.22183	.11257	.71089	.05548	.02076	.08345	.00966
VAP64	.12452	.13512	.07851	.16150	.18228	.69040	.00591	.01704	.08959	.04543
VAP65	.23537	.14254	.11694	.10552	.05174	.67501	.00351	.16718	.09785	.07905
VAP66	.06102	.06964	.17116	.04504	.18635	.24411	.07129	.11645	.02360	.11004
VAP67	.07513	.08213	.14594	.29354	.20278	.28000	.02697	.29516	.02360	.11004
VAP68	.13544	.04534	.07513	.22611	.18200	.47085	.02697	.29516	.02360	.11004
VAP69	.16504	.15716	.46791	.25136	.17003	.09341	.04821	.02869	.02360	.11004
VAP70	-.06330	.13544	.12536	.04292	.11917	.12621	.02627	.02360	.02360	.11004
VAP71	-.11354	-.07399	-.05822	.21567	.00225	.04139	.09155	.00229	.02360	.11004
VAP72	-.11693	.01125	-.05477	.07813	.02780	.00868	.6076	.36957	.14732	.16165
VAP73	.09791	.08830	.00762	.03993	.02993	.00767	.11916	.10242	.00285	.01352
VAP74	-.02084	.18224	.40436	.15197	.0152	.00375	.04943	.07976	.05604	.00895
VAP75	.01817	.07478	-.05574	-.05627	-.04249	.00310	.39810	.02728	.17416	.07976
VAP76	.21531	.15728	.15349	.18090	.05142	.06801	.13804	.14023	.00833	.03586
VAP77	.09147	.22250	.16091	.04000	.12506	.06460	.09042	.01734	.00335	.00335
VAP78	.13275	.33250	.18239	.11413	-.00028	.06354	.08096	.07378	.08897	.02767
VAP79	-.09391	.01728	-.02844	-.02632	.00597	.06820	.04776	.05747	.06524	.02767
VAP80	-.24501	-.04994	-.14524	-.07805	-.02049	.01619	.01619	.00130	.02951	.02951
VAP81	-.05060	.16592	-.00644	.01173	.02824	.09978	.06944	.01585	.10788	.07918
VAP82	.29765	.18274	.08385	.15194	.15779	.23384	.03153	.02719	.00553	.08115
VAP83	.37048	.35465	.09778	.23347	.12033	.10561	.06630	.06854	.00289	.17422
VAP84	.27025	.56768	.11748	.17084	.10413	.13982	-.11817	.14899	.06251	.15073
VAP85	.17904	.31339	.26389	.01596	.12010	.13798	.01851	.06185	.16217	.07492
VAP86	-.04242	.02056	-.01150	-.00702	.07279	.07860	.04917	.05177	.07776	.07795
VAP87	.22104	.71225	.06696	.19298	.00983	.10978	.00074	.09341	.06500	.07880
VAP88	.54346	.31474	.06512	.15992	.11715	.07245	.03045	.03273	.00378	.02353
VAP89	.16459	.75129	.21024	.14661	.05636	.10932	.03405	.02341	.04452	.10813
VAP90	.19095	.57216	.11760	.02458	.16841	.17824	.13007	.09286	.00336	.02777
VAP91	.26262	.40430	.07138	.00732	.19216	.68097	.11074	.07761	.03638	.06529
VAP92	.65773	.16824	.07652	.00392	.04750	.01333	.01040	.07761	.03638	.06529
VAP93	.16747	.75665	.08356	.15223	.06315	.04897	.03853	.05579	.04510	.00575
VAP94	.13439	.45404	.16359	.12125	.06315	.04897	.03853	.05579	.04510	.00575

	FACTOR 11	FACTOR 12	FACTOR 13	FACTOR 14	FACTOR 15	FACTOR 16	FACTOR 17	FACTOR 18	FACTOR 19	FACTOR 20
VAP51	.12019	.03330	.14790	.11595	-.07499	.09856	.00805	-.05127	.19342	.05506
VAP52	.01192	-.00597	-.00254	.06908	-.02464	.05036	-.02215	-.01394	.08253	-.01429
VAP53	-.02256	.06935	.01291	-.05860	.07167	.01254	-.04122	-.04965	.01446	.08161
VAP54	.07374	.05760	.02714	.01262	.00618	.03794	.03742	.22740	-.00731	-.08179
VAP55	-.05127	-.07158	-.03666	.05159	.04311	.12406	-.02159	.04604	-.18547	-.05549
VAP56	.40840	.06088	.01254	.01706	-.09535	.17200	-.17065	-.03998	-.20495	.04377
VAP57	.29809	.03715	-.10720	.13242	-.04229	.16831	-.12065	-.03470	-.16236	.02032
VAP58	.06411	-.01840	-.02262	.04517	-.09321	.00862	.01360	-.00373	.00542	.12117
VAP59	-.05310	.07172	-.02706	-.06400	.03120	-.02227	.00207	.03445	.03814	-.04455
VAP60	.01971	.06261	.04706	.03000	.06312	-.02111	-.03330	-.03572	-.02922	.03300
VAP61	.07000	-.04750	.14525	.02212	.07972	.09362	-.05551	-.03258	.00794	-.10516
VAP62	.02158	-.12358	.04807	.10466	.22680	.04404	.01600	.05270	.03214	.03650
VAP63	.06534	-.04990	-.03977	.10027	.03019	.04664	-.01188	.02867	.02867	.12124
VAP64	.05213	.17140	.02491	.13389	.02636	.15663	.01371	-.07661	-.09658	-.05773
VAP65	.02470	.02719	-.11213	.03443	.02536	.05986	.12531	.07481	.07418	.02842
VAP66	.06400	.01437	.04204	-.00195	.09492	.62877	.00375	-.05279	-.09404	-.03731
VAP67	.23234	.08404	.14554	.15919	.13204	.09185	.02407	.01045	-.17774	.12939
VAP68	.01206	.01946	.06253	.18312	.17010	.22582	-.22134	.09049	-.06150	.04683
VAP69	-.01782	-.03254	.17468	.06544	-.03039	.15873	.18275	-.03760	.11265	.05178
VAP70	.09270	.14500	-.00308	.09119	.06422	-.00213	.04575	-.03638	.09291	.07341
VAP71	.07044	.10183	.02166	.03860	.04394	.05990	.14238	.14972	.05643	.13222
VAP72	.16425	.24700	.03127	.11482	.08479	-.12974	.06550	-.24609	.21105	.07611
VAP73	.00291	.05145	.05003	.02985	.80181	.05304	.00312	.00312	-.01054	-.00552
VAP74	.00781	-.05667	-.08266	.39616	.14303	.13478	.02340	.12255	-.02119	.04243
VAP75	-.05300	-.07840	.07061	.04591	.05106	.05339	-.00148	-.00312	.02119	.04243
VAP76	.01274	.16708	.12368	.07306	.12611	.05017	.06017	-.11079	.10977	-.22002
VAP77	-.00759	-.02470	.01063	.01001	.05944	.08617	.11166	.10546	.08551	.07333
VAP78	.13122	-.02404	.09531	.03128	.05261	.06091	-.05261	-.08777	.03226	.05498
VAP79	.04207	.04311	.05154	.03400	-.05261	.14516	-.13662	-.01268	-.04081	.07719
VAP80	.04482	.04058	.02349	.03400	.02968	.00456	.17305	.02784	.02784	.08437
VAP81	.01729	.10486	.01495	-.00927	.03619	.10591	.21047	.04396	.11105	.02221
VAP82	.07811	.23579	.12763	.28585	.03629	.15385	.14982	-.14982	-.01018	-.03854
VAP83	.01605	.05471	.01788	.02165	.11703	.11170	.06651	.08040	-.05469	.12484
VAP84	.12917	-.06915	.01788	.02165	.07404	.01958	.04841	.00075	.07029	.14472
VAP85	.1571A	.00141	-.07622	.30114	.02137	.01981	.11693	.01252	.09145	.15233
VAP86	-.08567	.01994	.04610	.81769	.02938	.25406	.00422	.02831	.14492	.06567
VAP87	.11322	.04542	-.07376	-.07278	-.04473	.01618	.00620	-.11475	-.00953	-.05370
VAP88	.07473	.22099	-.00743	.19460	.04473	.01618	.01014	-.08615	.00480	.05116
VAP89	.01904	.01416	.00134	.07991	.10019	.04767	.03346	.02329	.07147	.09553
VAP90	-.08771	.23791	.10504	.00191	.18604	-.05519	.01611	.08816	.02270	.02591
VAP91	.11627	.34445	.03304	.14355	.11133	.03411	.08643	.18569	.06247	.16513
VAP92	.1351A	.07905	.02379	-.03792	.02347	.09708	.21625	-.13440	-.09449	.19447
VAP93	-.00305	.02435	-.02138	.02145	.06392	.06392	.03624	-.14084	-.09489	-.00809
VAP94	-.05646	.08377	-.06400	.18494	-.02291	.13464	-.04263	.05392	-.11130	.04823
							-.01330	.08192	-.09143	-.03101

	FACTOR 21	FACTOR 22	FACTOR 23	FACTOR 24
VAP51	-.04515	.02530	-.11613	.01110
VAP52	.04203	.06839	-.04307	-.02067
VAP53	.04761	.04420	.03419	.06072
VAP54	.20070	.02337	.24330	-.15655
VAP55	-.00475	.04014	.17728	-.01274
VAP56	.00095	.14701	.09951	.10146
VAP57	.15414	.10815	-.04337	.06617
VAP58	.06431	.10716	.08019	.05297
VAP59	.00909	.13944	-.09575	-.10467
VAP60	.02501	.06406	-.05434	-.07492
VAP61	.04210	.07440	-.01171	.02800
VAP62	.10710	.01119	.01312	.00793
VAP63	.15091	.06356	-.04198	-.06074
VAP64	.05668	.12199	.02403	.02694
VAP65	.16021	.12183	.07691	-.10382
VAP66	.12163	.20750	.00815	-.04018
VAP67	.04265	.22351	-.03433	.07874
VAP68	.03402	.21193	.04441	.03054
VAP69	-.02407	.12310	-.00733	-.00523
VAP70	.02314	.02190	.12930	-.16804
VAP71	-.07758	.14372	-.04389	.23151
VAP72	-.01849	.02700	.11282	.09442
VAP73	.10090	.08269	.13872	.03773
VAP74	.14854	.10862	.14295	.29523
VAP75	-.12624	.07544	-.05383	.24024
VAP76	.08400	.63460	-.08906	-.11698
VAP77	.06057	.75864	-.03891	-.01795
VAP78	-.07515	.67576	.01419	.04709
VAP79	.00284	.13274	.19083	.10074
VAP80	.04524	-.06640	-.02549	.68241
VAP81	-.00128	.00944	-.13035	.01435
VAP82	.12225	.42359	-.02726	.04275
VAP83	.00825	.47740	.02005	-.06778
VAP84	.11378	.21454	.08568	-.00400
VAP85	.04480	.30772	.01498	.06838
VAP86	.00184	.02110	.01517	-.03307
VAP87	.03287	.08568	.03524	-.13741
VAP88	-.01334	.21436	-.02954	-.13881
VAP89	.04191	.06168	.00547	.05556
VAP90	.07329	.23478	-.10722	.01572
VAP91	.07598	.23487	-.10124	.20351
VAP92	.00372	.16678	.11402	-.05407
VAP93	.06138	.13803	-.00549	.04018
VAP94	.03004	.15140	-.01678	.08586

APPENDIX D
CANONICAL CORRELATION OUTPUT

----- CANONICAL CORRELATION -----						
NUMBER	EIGENVALUE	CANONICAL CORRELATION	WILK'S LAMODA	CMT-SQUARE	D.F.	SIGNIFICANCE
1	.43790	.66174	.20980	575.45568	192	.000
2	.24679	.44472	.17324	363.16979	161	.000
3	.17743	.42122	.44422	294.70908	132	.000
4	.16259	.40322	.60082	197.73508	105	.000
5	.14410	.38484	.71746	122.74782	80	.001
6	.04085	.24435	.44221	63.24251	57	.284
7	.04461	.22047	.91629	32.21362	36	.649
8	.03649	.19207	.94311	13.85211	17	.678

COEFFICIENTS FOR CANONICAL VARIABLES OF THE SECOND SET

	CANVAR 1	CANVAR 2	CANVAR 3	CANVAR 4	CANVAR 5	CANVAR 6	CANVAR 7	CANVAR 8
FACTOR1	-.54214	-.01174	-.22435	-.03713	-.23373	.14191	.22115	-.05326
FACTOR2	-.22390	.16259	.05094	-.07809	-.33304	-.03713	.03176	.27058
FACTOR3	-.29240	-.19400	-.11794	-.09117	.19923	-.09117	.06051	-.43404
FACTOR4	-.24500	.17113	-.12900	-.12935	-.00049	-.26083	-.01191	.19149
FACTOR5	-.18678	.14700	.01622	.10759	-.03065	.17198	.07100	-.10041
FACTOR6	-.16783	-.05339	.05560	.01659	-.29644	.04190	-.23870	-.18827
FACTOR7	-.07600	-.12558	.23423	-.17084	-.18603	-.09343	.41912	.15715
FACTOR8	-.20003	.15668	.42422	-.24100	-.07915	-.01391	.11261	.01384
FACTOR9	.27248	.16493	-.25323	-.09303	-.18798	.44441	.17873	-.28864
FACTOR10	-.00410	-.10559	.32732	.09314	.11464	.02764	-.08375	.34988
FACTOR11	-.05734	-.14260	.21295	-.11391	.00662	.46490	.10787	-.06113
FACTOR12	.08472	.38892	-.18858	.28212	-.06740	-.16481	.06936	.18970
FACTOR13	.06414	-.01704	.04684	.02963	-.14855	-.12912	-.16772	-.34102
FACTOR14	-.10403	.52999	.21501	-.13248	.28399	-.05777	-.19913	-.29131
FACTOR15	-.01791	-.22690	-.11553	.09431	.27714	-.24325	.13597	-.13474
FACTOR16	-.08459	-.14523	.29231	.17487	-.21931	.09055	.24561	.20819
FACTOR17	.13302	.37540	.09957	-.00278	-.17530	.01194	.24421	.01054
FACTOR18	.06130	.22422	-.44100	-.32291	-.35972	.02603	.02966	-.03169
FACTOR19	.19634	-.14271	.12735	-.17406	.26562	.23361	-.00713	.02015
FACTOR20	-.05943	.04353	.02879	.15128	.15515	.24054	-.44367	.36598
FACTOR21	-.15944	-.06227	.14608	.11681	-.28906	-.30970	-.22238	-.04056
FACTOR22	-.43781	.07844	-.11387	.02400	.08394	.31364	-.27232	.03089
FACTOR23	-.01944	.01459	-.01933	.12748	.02409	.10505	.33432	-.02748
FACTOR24	.10029	.10428	.15714	.67911	-.20374	.10515	-.05611	-.12798

COEFFICIENTS FOR CANONICAL VARIABLES OF THE FIRST SET

	CANVAR 1	CANVAR 2	CANVAR 3	CANVAR 4	CANVAR 5	CANVAR 6	CANVAR 7	CANVAR 8
VAR97	-.04469	-.76528	-.52798	.30886	.16882	-.35907	-.54735	-.37999
VAR98	-.19092	.35274	-.26305	-.111857	.41093	.10399	-.23425	.38929
VAR99	.33045	.53350	-.94004	.25859	-.32657	-.22088	.27658	.03394
VAR100	-.33255	.30045	.24484	.77161	-.44198	.43572	-.32413	.60942
VAR101	.37115	.15005	.28947	.31515	.67716	.65979	-.68256	-.04409
VAR102	-.12644	.58232	.34244	.23637	.29343	-.61323	.30186	-.65586
VAR103	.12455	-.13145	.29804	-.37001	-.80875	-.25206	-.32448	-.61162
VAR104	.00725	-.15069	.46511	-.10014	.23547	-.83075	.14240	.86309